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Editorials.

THE PROPOSED "VETERINARY SURGEONS ACT (1881) AMENDMENT BILL, 1907."

At the recent quarterly meeting of the Council of the Royal College of Veterinary Surgeons, held last month (October), a draft Bill with the above title was discussed. It was the natural outcome of the agitation which has been carried on with more or less vigour of late by various members of the profession, particularly Mr. F. W. Garnett, and by some of the Veterinary Societies, for increased powers for the protection of the profession against quacks and undesirable legislation. It has also been frequently stated that for the proper exercise of such powers as we already possess the funds of the Royal College of Veterinary Surgeons are insufficient; if that be so, and we are in full agreement, they would be much more so in the event of additional powers being obtained. The institution of an annual registration fee was suggested as being the best means of assuring the necessary funds, and so a poll of the profession has been taken to ascertain the general feeling on that subject. The result of that ballot up to the time of the quarterly meeting showed an enormous majority of 1,234 against 376 in favour of an annual registration fee of one guinea, while 55 were in favour of the principle, but suggested half-a-guinea as being sufficient. In the face of such figures, the Council had no option but to proceed at once with the proposal, and their dispatch in the matter is most creditable. The chief points in the proposed Bill are: (*a*) To

bring the registered practitioners clearly under the control of the Royal College of Veterinary Surgeons; (*b*) to institute an annual registration fee of one guinea, payable by all members of the Royal College of Veterinary Surgeons practising in the United Kingdom; and (*c*) to render it illegal for any person who is not on the Register of Veterinary Surgeons to state or imply that he is qualified to practise veterinary surgery or medicine, OR TO ACT for fee or reward as a veterinary surgeon in any branch of the science or art of veterinary surgery or medicine. When introducing the draft Bill, Mr. Garnett very properly stated that there were many other things needed, but as they might be got later by means of a charter, which is much easier to obtain than an Act of Parliament, he thought they would be ill-advised to crowd too much into the Bill, and so increase the dangers of its rejection. It seems to us, however, that one rather important feature is still lacking. We are of opinion that the hands of the Royal College of Veterinary Surgeons would be much strengthened in the prosecution of unqualified persons practising canine and feline surgery and medicine, if the expression "Science or art of veterinary surgery and medicine" was clearly defined as "The science or art of surgery and medicine as referring to the domesticated (or lower) animals." We believe that some prosecutions against canine specialists have failed chiefly for want of this definition. It seems to us also that this section will deal the death blow to unqualified assistants, since their names are not on the Register, and, moreover, no fees could be recovered in respect of any advice given or operations performed by them.

We heartily congratulate Mr. Garnett on the results up to the present of his work in this connection, and hope his efforts will be crowned by the passing of the proposed Bill with the necessary recommendations.

THE RECENT "ANTHRAX" CONVICTION.

IN our last issue we reviewed the facts of the conviction of a veterinary surgeon who was not an inspector for cutting off the ear of a dead cow to make a microscopic examination of blood, it subsequently transpiring that the said cow died of anthrax. We

also expressed the opinion that the Royal College of Veterinary Surgeons should take up the appeal in a case with such far-reaching effects. However, we are glad to say that the conviction has been appealed against and quashed at Quarter Sessions. We would have been better satisfied if the latter decision had been given by some higher tribunal, but we very much doubt if there will be any recurrence of such a ridiculous and irritating prosecution. We submit that counsel for the respondent practically gave away his case when he called attention to Section 17 of the Anthrax Order, which stated that where the owner or person in charge of an animal was charged with an offence against the Act of 1894 relative to anthrax, he should be presumed to have known of the existence of that disease, unless and until he showed to the satisfaction of the Court that he had not knowledge thereof, and could not with *reasonable diligence* have obtained that knowledge. We submit that no veterinary surgeon of the present day could claim to have exercised "*reasonable diligence*" in such a case unless and until he made a microscopic examination of the blood of the dead subject. However, the main point, so far as we are concerned, is that the appeal was successful. But we hope that the suggestion of Mr. Simpson at the last Council meeting will not be lightly passed over. He suggested that the Board of Agriculture should be asked to slightly alter the wording of the Anthrax Order, so that the spirit in which it was promulgated might be more easily interpreted, and such vexatious prosecutions prevented in the future.

DOGS AND THEIR LICENCES.

We wish to draw the attention of our readers to the note on the above subject kindly sent us by Mr. Finnie, barrister-at-law, on page 671. The view therein expressed by Mr. Finnie would seem a very logical and just one. However, we hope to refer again to the subject in our next issue at greater length.

Original Articles.

THE TEMPERATURE OF HEALTHY DAIRY CATTLE.

BY G. H. WOOLDRIDGE, F.R.C.V.S., PROFESSOR OF MEDICINE, ROYAL VETERINARY COLLEGE OF IRELAND.

I HAVE been impressed on many occasions when referring to the works of various observers, by the considerable differences in the average temperatures of apparently healthy cattle quoted by them, and also by the variations one might expect to meet with during health. Consequently I determined to make observations with a view to ascertaining, as far as possible, the mean temperatures of healthy cattle taken per rectum, and the extremes between which they might be expected to fluctuate under normal conditions.

Robertson [1] made observations on 352 cows and oxen, and gave 101·0° F. (38·85° C.) as an average, with extremes of 100° and 104·5° F. Singleton [1] gives an average of 101·5° F. (38·6° C.), with extremes of 100° and 103·3° F. His observations number 100. Hobday [1] made observations on eighty-seven cows, and agreed with Singleton in the case of the mean temperature, viz., 101·5° F.; but his range is a little lower, 99·5° to 103° F. Fred. Smith [2] gives 101·8 to 102° F. (38·7 to 38·8° C.). Colin [3], Meade Smith [4], and Thanhoffer [5], all give identical figures, viz., 100·4 to 101·3 F. (38 to 38·3° C.). Friedberger and Fröhner [6] give 101·8° F. (38·8° C.) as the average, and quote Hadschopulo, who took 50,000 temperatures at Moscow, and gave an average falling between 101·1 and 101·8° F. (38·4 to 38·8° C.). Thanhoffer [7] also quotes Gavarret-Rosenthal, who states the very low average of 95·5° F. (37·5° C.).

On comparing these figures it will be seen that Robertson and Fred. Smith gave a *mean* temperature of 101·9° F., which is ·6° F. higher than Colin and others give as the *higher extreme*. Again, comparing the averages of Robertson and Gavarret-Rosenthal, we find a difference of almost 2·5° F., the former giving 101·9° F., and the latter 99.5° F.

The observations I have recorded were all made on apparently healthy dairy cattle. They number 1,395, and were made on 174 animals. I shall presently draw attention to the fact that a large proportion of these animals were subsequently submitted to the tuberculin test, and that many of them reacted. But it is advisable first to see what their average temperature is, in order to compare it with those quoted by previous observers, who omit to state whether the subjects of their observations were proved free from tuberculosis, in which case I think it is fair to conclude that they come under the same heading of "apparently healthy" animals. I find, then, that the average temperature of these 1,395 observations is 101·6° F. (38·66° C.), which is ·1° F. higher than Hobday and Singleton give, and ·3° F. higher than Colin and others give as the higher extreme.

Much greater importance, however, must be attached to the statistics based upon observations made on animals proved to be free from tuberculosis, which is often responsible for considerable fluctuations. I know of no such observations previously recorded. In fact, nearly all the statistics we have were compiled before tuberculin was introduced into regular practice; and its use is the

only definite method we have of detecting most of the early cases of the disease.

Of the previously mentioned animals, sixty-three of those tested failed to react to the tuberculin, and were consequently considered to be free. On those sixty-three animals I have 520 observations; and the average temperature I find to be 101·4° F. (38·5° C.). The lowest recorded temperature of the 520 was 100·4° F. (38° C.), and the highest observed was 102·8° F. (39·3° C.); but these extremes were very rarely indeed met with. The lowest average of any individual was 100·8° F., and the highest average was 102·2° F.

Of the sixty-three healthy animals, only seven had an average temperature below 101° F.: and the same number had an average temperature of 102° F. or over.

Thus my conclusion is: that in healthy dairy cattle the temperature may vary between 100·4 and 102·8° F., with an average mean temperature of 101·4° F. (38·5° C.).

Some Causes of Variation.

Time of Day.—Some of the causes and the extent of the variations of temperature in health are well worthy of note, and therefore I made 370 observations on a dairy of thirty-seven apparently healthy cows, some in calf, and others not in calf. The temperatures were taken twice daily for five consecutive days; in the mornings about 8 o'clock, and in the afternoons between 4 and 5 o'clock, before feeding. The average morning temperature of 185 observations was 101·5° F., and the average evening temperature was 102° F. Thus we see an average rise of ·5° F. from morning to evening.

Feeding is usually credited with some slight influence in raising the temperature. In order to see to what extent this occurred, I took the temperature of the same thirty-seven cows during feeding between 4.30 and 5 p.m. The average temperature at that time was found to be 102·3° F. As the average temperature of rest of the same animals at the same hour on other days was found to be 102° F., it is permissible to assume that feeding was responsible for an average rise of temperature of ·3° F.

Drinking immediately before taking the temperature, is usually responsible for a slight reduction; but I have no records at hand to show to what extent.

Pregnancy.—To see the extent of the rise caused by this condition, I made sixty observations on six apparently healthy in-calf cows. Their average was 102° F. On comparing that with 310 observations made on thirty-one non-pregnant cows kept in the same cowshed at the same time, the average of the latter being 101·7° F., a rise of ·3° F. is shown, presumably due to their pregnant condition.

Various other conditions are said to cause variations of temperature in health, such as œstrum, rumination, active lactation, housing and the time of year. Hadschopulo states that, in cold weather, the temperature per rectum is raised from ·2° to ·4° F. (Quoted by Friedberger and Fröhner. [1])

All these observations were made on housed dairy cattle. I hope, at some future date, to be able to record the results of observations made on store cattle kept outside.

REFERENCES.

[1] ROBERTSON, SINGLETON and HOBDAY. Quoted by Schäfer, "Text-book of Physiology," p. 790.
[2] FRED. SMITH. "Veterinary Physiology," p. 306.
[3] COLIN. "*Traité de Physiologie Comparée des Animaux*," vol. 1, p. 1046.
[4] MEADE SMITH. "Physiology of the Domesticated Animals, p. 696.
[5] THANHOFFER. "Vergleichenden Physiologie und Histologie," pp. 476, 477.
[6] FRIEDBERGER and FRÖHNER. "Lehrbuch der Klinischen Untersuchungs methoden," p. 166.
[7] THANHOFFER. *Op. cit.*, pp. 476, 477.
[8] "Veterinary Pathology": translated by Hayes.

THE TEMPERATURE OF TUBERCULOSIS DAIRY CATTLE NOT CLINICALLY AFFECTED.

BY G. H. WOOLDRIDGE, F.R.C.V.S.

IT has long been an accepted fact that the temperature is of little assistance to the clinical observer in making his diagnosis in cases of tuberculosis in cattle by ordinary means; and one is not infrequently astonished, on examining the viscera of cattle in prime condition slaughtered for food, to find tuberculous lesions when least expected. Friedberger and Fröhner say, "The temperature of the body in tuberculosis may be normal, although we far more frequently find an irregular remittent or even intermittent fever up to 41° C. (107° F.) . . . Clinical diagnosis is very uncertain. No diagnostic sign may be present, especially during the first few months of the disease."

Since the introduction of tuberculin as a diagnostic agent, however, tuberculosis may be detected in the very earliest stages, and where there has been no reason to suspect the presence of the disease. Tuberculin has now been in use for a number of years, and during that time has had a very extensive trial and proved itself to be almost infallible when properly applied.

The observations here recorded were made on dairy cows that were not suspected of tuberculosis, which disease was only revealed by submitting the animals to the tuberculin test.

My observations number 505, and were made on seventy-four reacting dairy cows out of 137 tested. The temperature of each of the cows was taken on several consecutive days, and at various times of the day, and they were tested immediately afterwards. Obviously the temperature of these animals during the test period must not be included, since the reaction consists of a rise of temperature. The average temperature shown by the 505 observations is 101·7° F. (38·7° C.), which is ·3° F. higher than the average temperature of health. The lowest observed temperature was 100·4° and the highest was 104·3° F. The lowest average temperature of an individual was 100·6°, and the highest average was 103·3° F. The greatest range of any individual observed was from 100·7° to 104.3° F.; while the average of fifteen observations on that same cow was found to be 102·2° F. Of the seventy-four cows in question, 50 per cent. had an average temperature falling between 101° and 102° F., while ten averaged below 101° F., and twenty-seven averaged 102° F. or over.

Thus I am justified in concluding that tuberculosis in early cases causes only a slight rise in the average temperature, viz., ·3° F., but that affected animals are subjected to greater variations from day to day than non-tuberculous cows kept under similar conditions.

A rather startling side-issue is revealed by the testing of these 137 cows, and that is, the enormously large proportion of apparently healthy animals that reacted, viz., 74 out of 137, or 54 per cent.

THE SURGICAL RELIEF OF ROARING.*

BY W. L. WILLIAMS, V.S., PROFESSOR OF SURGERY IN THE NEW YORK STATE VETERINARY COLLEGE, U.S.A.

We had occasion to present a communication to this Association, at its last annual meeting, upon the surgical relief of roaring, embodying a brief description of a modified technique, with a report of ten cases, some of the most recent of which had not progressed far enough to determine the result (*Proceedings American Veterinary Medical Association*, 1906, p. 179).

We are now enabled to add somewhat to the recorded results in the ten cases reported last year, along with thirteen new cases, twelve of which have reached a stage where the results are apparently reliably determined.

Case 1.—A bay trotting mare so badly affected that she was practically worthless, and was being used for trading purposes. The operation was performed on November 10, 1905, and the patient discharged on December 11, much improved. On June 3, the owner reported some noise in breathing, but the animal was gradually improving. The difficult breathing was inconstant, and much of the the time was not observed. Somewhat later in the summer I was informed by Dr. Crawford, of Athens, Pennsylvania, in whose immediate territory the mare was owned and kept, that she was continually improving, and that when driven at a rapid pace on an ordinary road went sound.

Case 2.—As reported last year, this animal died soon after discharge from abdominal disease after working but little, though showing very distinct improvement.

Case 3.—A brown gelding, used for general, farm, and road work, had become a very bad roarer. He was operated upon on December 14, 1905, and discharged January 17, 1906, distinctly improved. He was put to ordinary work, but gradually improved until the owner was able to report on July 3 that the recovery was complete, and that no abnormal sound was made while at work on farm or road. In a communication, dated April 5, 1907, the owner stated that the animal remained sound.

Case 4.—A bay trotting mare, which had become worthless for road work on account of roaring. She was operated upon January 29, 1906, and discharged March 14, improved. The owner reported on May 22, 1906, that she was greatly improved, and doing satisfactory

* Presented before the American Veterinary Medical Association at Kansas City, Mo., September 12, 1907.

work. On August 26, 1907, the veterinarian in whose territory the patient was owned and kept when operated upon, reported that the improvement had continued, but that the animal had left the vicinity.

CASE 5.—Patient a valuable coach horse, from the practice of Dr. W. H. Ridge, of Trevose, Pa., which was operated upon at the meeting of the Pennsylvania Society on March 6, 1906. Fifty-one days later Dr. Ridge reported that the horse tested sound at a gallop, and on June 11 of the same year he was given a keen drive on a tally-ho without revealing any abnormal sound. On August 17, 1907, Dr. Ridge further reported the horse still at tally-ho work, and perfectly sound.

CASE 6.—A very bad roarer, operated upon in our clinic May 23, 1906, and last report stated that he was working sound on August 16, 1906.

CASE 7.—An exceedingly bad roarer, unfitting him for slow, light work. The operation was performed in the practice of Dr. V. M. Knapp, of Danbury, Conn. The operation was highly successful, and fully restored the animal to usefulness; he was sold at a good price, and later died from other causes.

CASE 8.—A bay road mare, belonging to Dr. C. E. Clayton, New York City. Operation was performed July 6, 1906. The operation was practically without result: the character of the sound was altered, the fluttering as in tracheal stenosis, which is little, if any, less than the original roaring in volume. In our communication of last year we related that in an experimental case the arytenoid cartilage had dropped down into the cavity of the glottis and become firmly fixed there, apparently as a result of cutting away too freely and completely the vocal cords and adjacent tissues. In our judgment we here fell into this error, and removed too much supporting tissue.

CASE 9.—A brown coach gelding, in the practice of Dr. George H. Berns, of Brooklyn, N.Y. Operated upon July 8, 1906. Soon after the healing of the wounds there was still considerable dyspnœa, although there was definite improvement. The improvement has been gradual until Dr. Berns reported, in June, 1907, that the horse was fully restored to usefulness.

CASE 10.—A brown road mare, in the practice of Dr. W. W. Kennedy, of Fulton, N.Y. The operation occurred on August 2, 1906, and marked improvement followed, and has remained; but there is still considerable dyspnœa whenever the animal is rapidly driven. So far as we can determine from reports, we here again fell into the error of removing too freely the vocal cords and underlying muscles, and allowed the cartilage to drop down into the glottis and become adherent there, obstructing the passage of air.

CASE 11.—A bay trotting gelding, from the practice of Dr. Ross, of New Haven, Conn., operated upon in the clinic of A.V.M.A. on August 24, 1906. The patient apparently did well for a time, but by October 1 was breathing very badly. On October 22, in company with Drs. Kelly, Whitney, Bland, Adams, and Lyman, the horse was examined, and found greatly distressed in breathing, making a loud noise while standing quietly in the stall. Examination of the seat of tracheotomy revealed it enlarged, and slight pressure upon the point increased the dyspnœa to the point of threatened suffocation. The animal was cast, the trachea opened at point of tracheotomy, and it

was found that one or two tracheal rings had collapsed, one had softened and largely disappeared, the collapse causing almost complete stenosis of the trachea. A trachea tube was placed in the wound pending further decision. The animal later passed into the control of other parties, and reliable trace of him was lost.

CASE 12.—Patient a very bad roarer, property of Dr. L. B. Judson, Winsted, Conn. Operated upon at A.V.M.A. Clinic, August 24, 1906. Dr. Judson reported personally on August 6, 1907, that the horse was still in his possession and used in his practice. Under ordinary conditions no abnormal sound can be detected, but by loading him heavily and driving rapidly up hill a slight abnornal sound is sometimes noted.

CASE 13.—Patient a black gelding, from the practice of Dr. Thomas Bland, Waterbury, Conn., had been obliged to wear a trachea tube for one year because of severe roaring. Operation at A.V.M.A. clinic, August 24, 1906. Reported by Dr. Bland, August 6, 1907, to be entirely cured.

CASE 14.—Patient of Dr. G. P. Jeffery, Elmira, N.Y.; grey saddle gelding, bad roarer. Operation August 31, 1906. On November 27, 1906, the owner reported little or no improvement. On March 15, 1907, Dr. Jeffery reported that he was gradually improving, but that he still roared slightly at times under unusual excitement. Owner had recently ridden him eight miles in forty-two minutes, or at a pace of 11·4 miles per hour, without inducing abnormal sound.

CASE 15.—Patient occurring in the practice of Dr. W. L. Baker, Buffalo, N.Y. Operation in clinic of New York State Veterinary Medical Society, September 13, 1906. Dr. Baker reported animal completely cured in February, 1907.

CASE 16.—Patient a thoroughbred hunter, a bad roarer, which could not follow hounds. Operation October 1, 1906. When the wounds had healed after about four weeks it was found he still roared. The patient was kept under observation for some two weeks longer, and was finally secured, anæsthetised, and the larynx reopened, which revealed the fact that the left arytenoid cartilage, instead of adhering in the normal position to the thyroid, had dropped down over the cricoid and adhered there, with its antero-inferior or vocal angle projecting out into the glottis, greatly decreasing its lumen, and evidently largely, if not wholly, responsible for the continued roaring. The projecting angle was largely excised. The owner reported on July 29, 1907, that the horse had made a thousand mile journey during May and June, doing the work well, but could not gallop rapidly without roaring badly.

CASE 17.—Patient from the practice of Drs. Johnston and Backus, Geneva, N.Y. Operated upon in the college clinic, December 2, 1906, and discharged on December 23. Case apparently progressed well until the spring of 1907, or about four months after operation, when dyspnœa developed, and became so greatly aggravated that the animal was destroyed. Opportunity for an efficient autopsy was not offered, but, so far as could be learned by limited examination, the difficulty lay in the inflammation and collapse of the severed cricoid cartilage.

CASE 18.—A very bad case of roaring in a thoroughbred used in steeplechase racing. The operation was performed in practice of Dr. E. J. Sullivan, Saratoga Springs, N.Y., on November 29, 1906.

A trachea tube was inserted during the operation and removed immediately after. On March 4, 1907, Dr. Sullivan reported that the owner and trainer had tested the horse over 5 feet 9 inch hurdles without producing abnormal sound. Later it was reported that the horse had refused the hurdles when put to training, so has not raced, but the recovery from roaring at last reports was apparently complete.

Case 19.—A thoroughbred gelding, entered in the college clinic November 19, 1906. When discharged he had been galloped as hard as considered prudent, and tested sound. The owner reported July 30, 1907, that the horse had been in training two weeks, but had not been pushed far enough to determine his ability to stay over a long distance.

Cases 20 and 21.—Two hunter geldings, both very bad roarers; operated upon in the college clinic January 16, 1907, and discharged March 4, 1907, after testing sound at a moderate gallop. The owner reported, July 29, that no test had yet been made in the hunting field. They had been tested in farm work, on soft ground, enough to demonstrate that they were very greatly improved, and at least were sound for ordinary work.

Case 22.—Thoroughbred belonging to same party as Case 19, and operated upon in the college clinic April 27, 1907. Discharged June 4, 1907, after testing sound at a moderate gallop. On July 30 the owner reported horse turned to pasture without having been severely tested.

Case 23.—Property of Dr. B. D. Pierce, Springfield, Mass. Operated upon in the clinic of the Connecticut Veterinary Medical Society, August 6, 1907. The horse was a very bad roarer, and wearing a trachea tube. Upon opening the larynx there was observed a tumour, or firm swelling, above the right arytenoid cartilage, while the left cartilage was passive. The usual operation was performed without interfering with the tumour above the right cartilage. On account of this tumour, or swelling, about 2 inches long, and projecting over the glottis $\frac{1}{2}$ inch, an unfavourable prognosis was given.

In this list of twenty-three cases the results in twenty-two have been fairly determined, the last being too recent for any conclusion, and because of other complications being of little, if any, value in determining the efficacy of the operation.

Of the twenty-two cases, two, or a trifle less than 10 per cent., were, in a sense, ruined, less than 14 per cent. were left slightly improved or unchanged, while the remaining seventeen, or 77 per cent., were either greatly benefited or completely cured, and were made capable of rendering satisfactory service.

Of the two cases ruined, one (11) was not due to the major operation itself, but to the tracheotomy followed by chondritis and tracheal stenosis. In the second case (17) the bad results seemed to be due to a chondritis resulting from the wound of the cricoid cartilage and first tracheal ring, with stenosis at this point.

Those cases which were left but slightly benefited or approximately unchanged, Cases 8, 10, and 16, failed, apparently, because of the too free removal of the vocal cords and underlying muscles.

In our communication of a year ago we related that in our first operations we had removed the vocal cords, the mucous membrane from the ventricle of the larynx, and the inferior bundle of the thyro-

arytenoideus muscle. We then became suspicious that we had removed too completely the retaining tissues of the cartilage, and allowed it to drop too completely into the glottis, and there to become fixed, and to partly fill the air passage, and we consequently aimed merely to remove thereafter the vocal cords and mucous membrane of the ventricle.

Even here we seemed to fall into error, because the muscles underlying the vocal cords are so wasted that they have little power in retaining the cartilage in position, and it was only after we had made the second operation on Case 16 that we realised that this displacement of the cartilage into the glottis was a danger to be reckoned with so long as the vocal cords were removed that we abandoned this, and confined our interference to the removal of the mucous membrane lining the ventricle. This is an old operation, attempted by Günther apparently, and abandoned by him as inefficient; but we have not been able to find his technique.

As now performed by us, the horse is secured in dorsal recumbency under chloroform, and with a trachea tube in the ordinary position. The larynx is opened by a median incision through the crico-thyroidean ligament, the cricoid cartilage and first tracheal ring. The mucous membrane of the ventricle is grasped, usually at the median margin, where it is attached to the arytenoid cartilage, and an incision is made with a long-handled scalpel through the membrane, between the arytenoid cartilage and the forceps. The incision is then continued completely around the margin of the ventricle, invading the vocal cords little if at all. The isolated mucosa of the ventricle is then drawn upon by the forceps and carefully divided from the adjacent tissues, the aim being to dissect out the membrane as a complete sac, necessitating adhesion in the process of healing.

Thus far this change has resulted in more prompt, uniform, and complete alleviation of the roaring, but we are not yet ready to state just how much tissue should be removed. It appears to us that once the mucosa has been completely removed from the ventricle, adhesion by cicatrisation is inevitable, and if the adhesion occurs with the passive cartilage approximately in its normal position, it must cease to act as an obstruction to the entrance of air. We have reason to hope that we may be able to avoid, by our change in technique, the losses from imperfect cures, which have amounted to 14 per cent., but the danger from tracheal stenosis, either at the point of the tracheotomy or laryngotomy, seems to offer difficulties of a formidable character.

In one case the trachea tube was kept in place only till the operation was completed and the horse was on his feet, and the patient did splendidly. We fear that generally we have kept it in place too long, but in two cases where we tried immediate removal we were obliged to reinsert it because of dyspnœa. Even if we could avoid the ordinary tracheotomy entirely, the danger of tracheal stenosis would not apparently be obviated, because in one case we appeared to have stenosis from the wound in the cricoid and first tracheal ring, although no tube was used in this wound.

It has been proposed to avoid tracheal stenosis in this region by dividing the thyroid and leaving the cricoid and first tracheal ring intact, but we are unable to determine that such a wound might not be followed by untoward disease of the thyroid. Study upon this point is

needed. On the whole, our investigations have thus far proven highly interesting. The proportion of recoveries has been high, each case, aside from the two instances of tracheal stenosis, if not cured promptly, have either shown constant improvement for a year or more, or, at the worst, have remained practically unchanged, in which respect they differ materially from the results following arytenectomy, where cicatrical tumours and necrosis or other diseases of cartilage occlude or deform the larynx, and invite a gradual and usually insurmountable development of dyspnœa.

The operation is simpler, has less danger for the life of the animal, the patient recovers far more promptly, and, all in all, while since last reporting two animals have been practically ruined by the operation, we yet feel that the results have added to the encouragement entertained last year. In the two animals which were practically ruined the disease had already rendered them of little or no commercial value, except through the agency of permanent tracheotomy, and this course was still freely open in each case; but few Americans will consent to use a horse while wearing a trachea tube.

We venture to thus briefly lay before you the results of our investigations to date, hoping that they may arouse increased interest in the practicability of the restoration to usefulness of a large proportion of valuable animals affected with roaring.

THE RELATION OF FARMER AND VETERINARY SURGEON.

BY "UMPIRE."

THE author of this article has chosen the *nom de plume* of "Umpire" on account of the peculiar position he is in. Educated as a farmer, always keen on veterinary work and the profession, late in life forsaking the former for the latter, places him in the position of being able to view the situation unbiassed, and, perhaps, able to throw out some hints which may bear fruit in the relationship between the profession and its most valuable clients.

First allow a review of the situation from the farmer's point of view. An animal is taken ill. The element of feeling for the patient's suffering is, I fear, if not always, at all events in the great majority of instances, but a minor consideration to him when compared to the commercial aspect. He has, therefore, to ask himself these questions:—

(1) Do I know what is the matter with this animal?

(2) Can I cure it myself?

(3) How much is the animal's commercial value, if I kill it at once, before spending any money upon it, and before giving it any medicine which may destroy the value of the carcass?

(4) If I treat the animal myself, or send for a professional man, how long is it going to be ill, and what will be the expense of curing it?

To discuss the first question is fruitless, for almost every farmer has a very keen sense of diagnosis—or shall we call it intuition?—of the common diseases of farm stock, and generally, rightly or wrongly, answers it in the affirmative.

Now comes the difficulty, "Can I cure it myself?" In many cases the farmer keeps a large case of patent medicines by him, also a smaller or larger library of veterinary works, as well as a weekly paper, canine or agricultural, which contains a veterinary column edited by some traitor veterinary surgeon, who answers questions and gives advice gratis. He then commences, with these "aids," to treat the animal. In some cases it recovers, when the fame of "So and So's" drink or "oils" spreads round the neighbourhood, only to do the professional man out of more cases. The library is also lent out, and brother "Giles" copies out copious recipes, to be used at a future date.

Then there is the other class of farmer, few and far between, who does not attempt amateur doctoring. He sends for the professional man, but alas! only too often when the disease has become beyond mortal aid. When asked why he delayed getting professional assistance, the answer is nearly always: "I hoped it would get better without treatment, and it is not worth spending a lot of money upon!"

We also have the man to contend with who says: "Cheaper to let the horse die, or to kill the bullock or cow, than to have a vet. to it." Now, in practice this statement should not be true, but I fear on analysis it often is. Take, for example, a store bullock of the value of £12. It is taken ill with some disease which requires more treatment than the mere administration of a cathartic. A veterinary surgeon is summoned, and has to call for a period of a week, perhaps, every day, and two or three final visits. There are the journeys to pay for, professional attendance and medicine, which, at a low estimate, can be put at, say:—

Seven journeys, at 2s. 6d.	£0	17	6
Seven attendances at 3s. 6d.	1	4	6
Medicine	0	18	0
Total	£3	0	0

Now, had the bullock been killed immediately on sickening, he would certainly have been worth £9, and there would have been no risk of the treatment failing and the animal dying full of physic, and worth from 15s. to £1.

Having taken the farmer's point of view, let us consider that of the veterinarian. He has first of all to maintain the dignity of his profession, and also to do his work at fees profitable to himself, taking into consideration the risks both bodily and financial. He is often treated with but scant consideration by his client, being only called in late at night, many hours after the animal has been taken ill, and when treatment is almost hopeless, and often the patient has been made a veritable cesspool for patent and quack remedies. If the patient dies, he is blamed; if recovery takes place, it is laid to the door of the nostrums which were given before the veterinarian's arrival.

Now, let us consider in what way the veterinarian can meet the difficulties which present themselves. Firstly, the members of the profession should set their house in order as regards the circulation of books, written in popular language, on veterinary medicine and surgery. The publication of such books for the general public should be punished by the Council of the Royal Veterinary College as severely as advertising in a newspaper, hoarding, or omnibus, or any other unprofes-

sional conduct. If the Council had only the courage to attack, and treat summarily, some of the leading offenders in the profession—men who have been teachers at our colleges, and also men considering themselves canine specialists, &c.—this would soon have a deterring effect, and remedy this great injustice to the profession at large.

Secondly, some sort of legislation is wanted restricting the sale of patent and proprietary medicines. I purposely name proprietary articles, as even some of the profession stoop to this practice, not stopping at the contortion of their Christian and surnames to get a catchy name for some drink or other with which they may attract the public eye. I fear, although the motto of the Royal College of Veterinary Surgeons is "United we stand, divided we fall," it is but seldom acted up to. A movement of this sort would want the entire support of the profession, and also of the twin medical profession, to bear any fruit whatever. But I am certain, if the question were brought up at every Veterinary Society's meeting, and the brother profession approached, eventually fruit would be borne of the effort, and this unjust competition lessened, or done away with by legislation.

In France and Germany the sale of patent medicines is subjected to such a heavy tax as to make their profitable sale almost impossible, in addition to which Germany insists that every bottle and package shall contain the exact formula of the contents.

But in the meantime, how is the competition to be met? I hold that every veterinarian should refuse to attend an animal that has been given any of these quack nostrums. He should further gain the confidence of his client, and be able to persuade him to purchase any medicines he requires from him. Of course, if the practitioner insists on charging one shilling for a ball which can be purchased at the chemist's for fourpence, and other medicines at proportionate prices, he cannot blame the farmer. But surely the practitioner can successfully compete against patent medicine vendors who have to spend such enormous sums in advertising and putting their goods up in what the Americans call "elegant packages."

A further grievance from which the profession is suffering, and one, I believe, not generally known by it, is the price at which they purchase their drugs. The wholesale druggists send out price lists to veterinary surgeons which are accepted by the latter as wholesale prices; this, however, a chemist informs me, is not the case. The quotations are at a considerably lower rate than retail prices, but in many cases 20 to 25 per cent. higher than charged to retail chemists. If this is so, surely it ought to be remedied by combining against and coercing the druggists to give the profession the same terms as chemists. The quantities used in veterinary medicine are larger than in human medicine, and surely ought, if anything, to have the advantage of purchase in bulk.

THE PREPARATORY EDUCATION OF VETERINARY STUDENTS.*

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In estimating the strength of a veterinarian or member of any other profession our attention is directed prominently to three important factors.

(1) His personality, his mental capacity, character, integrity, vigour, prudence, and enthusiasm.

(2) His academic or preparatory education.

(3) His scientific or professional attainments.

Some emphasise one of these, others believe another the most important, but in our dealing with the second we shall draw no comparisons with the other two, and shall regard each of the three as alike essential to efficiency.

The preliminary training of the student has from the first constituted a complex problem in American veterinary education, and no substantial agreement has yet been reached in either theory or practice. In the majority of American veterinary colleges the matriculation requirements are elastic and evasive, and any definite entrance demands are darkly veiled beneath a "common school education," which may be made to mean anything or nothing as the interested parties may elect. Neither are we to hope for any accord in this direction until we reach a common ground also in reference to character and professional training.

If we are to admit to our veterinary colleges the dissolute and dishonest, the mountebank and charlatan, with the same freedom or satisfaction that we do the highest type of young men, if after admiting students to college classes we offer a course of instruction which fails to enable them to secure an efficient professional training, then high matriculation requirements are in part or wholly wasted. Hence, in discussing the problem of preliminary education the other two factors suggested need be kept in view, since all three must be kept in harmony.

The aims of preparatory education for a profession may be expressed in two ideas, which, followed closely, ultimately converge and become essentially identical. On the one hand, it is held that the academic education demanded for entrance into a veterinary college should have for its chief or sole aim an enabling function through which the student shall be prepared to understand and profitably pursue the professional subjects, while others value academic training chiefly for the culture and refinement it affords, and by which the veterinarian is largely enabled to assume higher social rank in his community. The two thoughts need not be antagonistic. An education which will enable a man to pursue an advanced course in veterinary science with the greatest profit, also fits him to assume a position in his community as an educated gentleman; any course which ensures to the student a liberal education, at the same time contributes to his ability to acquire sound professional training, but when not designed intelligently to that end may not have the same practical value in a technical education.

* A paper presented to the Association of Veterinary Faculties and Examining Boards of North America, September 9, 1907.

The matriculation requirements of American veterinary schools are as variable as their courses of study, character of equipment or faculty.

The extremes may well be illustrated by the Ontario Veterinary College, which for many years demanded for entrance an examination in "Reading and Writing," and the neighbouring colleges in the State of New York which, under a State law, demand four years of satisfactory high school work. Between these two technical extremes every possible variation occurs both in theory and practice.

While the two requirements cited appear very wide apart, the actual difference depends largely upon the interpretation of the terms. Reading and writing are very indefinite terms, and the rule can be applied with great elasticity. A five-year-old child who reads from a primer "The dog runs," and can express it in characters which may be interpreted, may be said to be able to read and write, and has proven his claim by reading and writing. At the opposite extreme the rule could be so interpreted so as to comprise a thorough knowledge of the English language, ability to read and properly understand its highest and best literature and to write it readily, correctly, and fluently. Such an interpretation would surpass in some very important respects the apparently much higher requirements of New York.

Veterinary colleges in the State of New York may admit students upon Veterinary Students' Certificates issued by the Regents or State Education Department, but these are not mandatory, and the college may make further demands upon the student before registering him, although in practice they are admitted without further question in reference to preparatory education. In one, if not both, of the New York schools, the universities of which they each form a part have a very excellent rule by which any student who is markedly deficient in English may be excluded, a point which has not yet been too drastically applied to the matriculants in the veterinary colleges.

The quantity and quality of preliminary education to be demanded needs to be based primarily upon our interpretation of veterinary science. Two distinct and divergent views of veterinary practice are held in America; one group maintains that it is a profession, the other that it is a trade. Each party is correct; some practitioners belong to the one, some to the other. He who intelligently, earnestly, and efficiently studies veterinary science in college and in practice, and renders proper service to the livestock owners and the community, belongs to a highly honourable and honoured profession; he who memorises a few empirical rules by which certain symptoms demand the application of given remedies and authorise the collection of fees, makes it a trade or avocation, and a very poor one at that. In discussing our subject we shall aim to confine ourselves to the student who hopes to become a part of an honourable profession, and to the college which aims to have its graduates shun the veterinary *trade* and enter the *profession.*

Language constitutes the chief means for communication between man and man, and teaching is accomplished almost wholly through its agency, whether it be in class room, laboratory or clinic. If the student would profit by a lecture he needs to understand the language of the teacher and to be able to place some of the thoughts in a permanent form upon paper; if he would learn from a text-book, if he would learn from a library, he must understand the language of his author.

When the student has learned his text or received other instruction, he must employ language as the chief means of expressing the knowledge which he has acquired, and it is through this expression of thought in language that the teacher must chiefly judge of the work of the student, and which later constitutes our best basis for measuring the practitioner. The first and greatest essential in preparatory education is that of language—of that language in which the study is to be prosecuted. With the exception of Laval University and its alumni, English is the language of American veterinary education and practice, and should take precedence over any or all other preparatory studies. Education consists chiefly of an acquisition of the knowledge and thought of others, verified and elaborated by personal experience and observation. The student needs have such preliminary training that he may clearly comprehend the teachings of writers and lecturers; if these are to be of a high order, then his command of language must be of corresponding efficiency.

It is not easy to apply a fixed standard of measurement to acquirements in language. Two, three, or four years of English in a high school insures the contact of the student with representative English literature by the best authors, but it cannot assure us that he has learned the language. Inferentially, some knowledge of English has been acquired, or the student fails to pass the required examinations in this and other subjects, but frequently it is with a low mark which signifies a poor command of language. Only a small minority of American veterinary colleges emphasise English as among the requirements for entrance, but others apparently demand it by implication. The New York law makes no specific demands upon this point, but, as a matter of practice, high school graduates include among their studies more or less extended study of the English language and literature; and even in the technical absence of this, the pursuit of other branches necessarily involves the use of the language, and some degree of proficiency is assumed to follow as a logical sequence.

Veterinary science is a world science, and veterinary knowledge is recorded in many languages. Most and the best veterinary literature emanates from Continental Europe, where the governments have long supported veterinary education liberally and consistently for its value to the nation. A very large and important part of our standard English veterinary literature is translated, extracted, borrowed or otherwise obtained from European authors, and yet only a small part of this finds its way into our language after important delays or through imperfect translation. The volume of meritorious veterinary literature in the German, French, Italian and Scandinavian languages is so great that the successful veterinary student needs have command of one or more of these, especially of German or French, and we consider the college or teacher having the professional success of the student at heart should at least point out to him the great importance of a preparatory working knowledge of one or more of these before entering upon his veterinary study. In addition to the command of language which we consider so essential as a preparation for the study of veterinary science, there are other subjects of a preliminary character which need be mastered before the student can properly comprehend the purely professional subjects. Veterinary study and practice frequently comes into close relations with the natural sciences.

An elementary knowledge of physics is essential to a clear conception of anatomy and physiology, and in many ways in the mechanical handling of disease.

Botany has a wide interest in the study of animal foods, of organic drugs and of poisonous plants, and a majority of the infectious diseases are due to the growth of vegetable organisms within the tissues of the animal body.

Zoology includes within its field the domestic animals themselves, their organisation, habitat, food, methods of feeding, the changes wrought in them by food or other conditions. It embraces a long list of animal parasites of that higher group known as entozoa and epizoa, those parasites which, in addition to their direct injuries, also act as the bearers of other smaller parasites, like the trypanosomes by the mosquitoes, and finally the protozoan group of disease-producing organisms.

Chemistry holds an important place in the preliminary education of the veterinarian. Elementary chemistry is essential to a due conception of the composition of foods, medicines, poisons, and of the secretions and excretions of the animal body.

We have mentioned briefly those studies which seem directly essential as a basis for the advantageous study of veterinary science; the languages supply the means for the interchange of ideas, the sciences constitute the foundation for veterinary education.

In addition to the studies suggested, many others could be added with great benefit by affording a liberal education. The A.V.M.A. has placed its seal of approval upon the excellent preparatory work accomplished by the agricultural schools, and recognises graduation from these as entitling the student to an allowance of one year in the veterinary college course; and in practice the veterinary colleges are always anxious to admit these men on as liberal terms as possible, finding them pre-eminent in their veterinary classes.

Such preliminary education as we have outlined fulfils alike the needs for efficiently studying veterinary science and the recognition of the veterinarian as an educated gentleman. It is essential that the latter object be kept constantly in view, since our profession cannot make the desired advances until the social position of the veterinarian is recognised as secure and honourable. Young men of refinement and education cannot be expected to enter the profession in large numbers unless they can be assured, as they can, that they will be admitted cordially into just as good society as veterinarians as they would be in any other profession or calling. College degrees cannot give a man social position, or it would be easily acquired through high-sounding veterinary degrees so liberally bestowed. Legal enactment cannot secure social prestige, or some of our State veterinary laws would work wonderful effects upon certain of the veterinary practitioners. The A.V.M.A. has attempted to secure recognition and rank for the veterinarian in the United States Army, but has failed, perhaps largely because it was attempted by legal enactment to make an uneducated man the social and official equal of an educated one. The standing of a veterinarian in his community depends not upon his college degree nor upon legal enactments supposedly in his favour, but upon his personal character, preliminary and professional training.

The completion of such a preliminary education as outlined would

require three or four years of diligent high school work, and would thus prolong the time necessary for the procuring of a veterinary degree. The time is not serious, however, in normal cases where the student attends school regularly, since he may accomplish his four years of high-school work at sixteen years and still allow five years for professional study ere he attains his majority. A boy with good mental capacity and an earnest worker can finish his high-school course, followed by a four years' course in arts or agriculture, and finish his veterinary course with an allowance of one year by the time he has reached the age of 22, surely young enough to commence his career as a veterinary practitioner.

The New York law, requiring four years of successful high-school work, which technically stands in the front rank among the veterinary schools of America, is deficient in quality and kind. It places too high a value upon quantity rather than quality. Latin or Greek count for as much as German or French ; higher algebra or geometry for as much as chemisiry or zoology. In so far as they relate to a liberal education, they are no doubt just as valuable, nor would we argue that they are not even better, but for our specific purpose we consider them distinctly inferior.

Quality counts for naught except to pass, regardless of the duration of time required. A man may take each subject two or more times successively before he finally passes, with marks barely sufficient to pass, but finally, when he succeeds, he is just as eligible for entrance to a veterinary college as the brightest and best of the school. If a man is studying English and barely passes for four successive years, he is probably a far poorer English scholar from the standpoint of efficiency than he who has passed one year with high honours, yet the man with four years' credit has four times the entrance credits that his superior fellow-student possesses, and each of these credits counts for as much with low marks as with high. It is a difficult objection to overcome, which is analogous to the student in the veterinary college who requires one or two extra years to limp through the veterinary college, his first year subjects forgotten before the last ones have been reached, yet he holds his place and drags himself through college to later continue to drag along through the world. We believe that a great advance could be made in the requirements of all those colleges demanding more or less high-school education by stipulating that certain specified branches be included, and that an allowance be made for quality. We would have English more highly valued for admission than Greek, and would regard a mark of ninety-five in one year of English worth as much as a bare pass in two years in the same subject.

Various objections are raised to the demanding of such preliminary education as suggested. It is claimed that the social position and the emoluments of veterinary practice in America do not warrant the expense, time and labour. Here and there we have enough of such veterinarians to disprove the claim. If any individual veterinarian is singled out for comparison it will be found that his standing is quite as good in his community as though he were a member of any other profession or vocation. In European countries where the preliminary requirements for the study of veterinary science are high, the members of the profession stand correspondingly high in their respective communities, in practice, in civil and military service.

The American veterinarian comes more and more in contact with broadly educated men. The enormous development of agricultural education has resulted in a large proportion of the leading farmers and stock breeders taking degrees from agricultural colleges, preceded by graduation from a high school: the leading merchants and business men who own animals, if not university graduates, are at least liberally educated. The veterinarian cannot meet these upon equal terms except with approximately equal education.

Invasion of fields logically belonging to the veterinarian are now and then threatened by the agriculturist because of his higher and better education, consisting of four years each of high-school and college or university work. We have been told that in some States the authorities prefer, for tuberculin testing, and hence for the control of bovine tuberculosis, the agriculturist to the veterinarian, simply because of his more thorough scientific training.

The veterinary service in America is everywhere defective and fragmentary. In the cities there are rules for the handling of corns and quittor probably a trifle in advance of half a century ago, but among fresh horses from the western farms, exposed during shipment and disposal to a number of deadly contagious maladies, there is virtually no plan for control, and the losses from this one group of affections cost the American people millions annually; each year enough to far more than pay the total equipment and cost of maintenance of all our colleges put together, and they will never be controlled until we have a more efficiently educated body of veterinarians. Conditions in the country are quite as bad if not far worse. A case of dystokia or retained afterbirth is handled approximately as it was by the cow leech of a century ago, infectious abortion is almost not handled at all, and sterility is treated by mysterious impregnation concoctions dispensed by veterinarians whose education consists wholly of a big degree. Over the whole field of veterinary practice only a part of the cases are handled at all, and there is scarcely an area which would not to-day afford abundant room for the addition of an equal number of veterinarians without affecting the practice of those already occupying the field. But the men for this task must be of a higher type than those now existing, and must be prepared to take up the work now left undone by existing veterinarians.

It is objected that men so highly educated as those we have suggested will not enter the filthy cow stable or pig stye to accomplish the needed work, and that for such duty it is necessary to have a more ignorant man who will blend with the filth. On the face of it the objection is untrue. If you would consult the literature upon the diseases under these filthy surroundings you must turn to the writings based upon the experience of highly educated men. True, the ignorant and dirty practitioner goes into these places, but we have no record of improvement as a result of it, the pig stye or cow shed is none the cleaner or better for it, and he so blends with the filth that his presence passes unnoted. The educated and efficient veterinarian enters the filthy places a clean person and emerges clean, he preserves his identity and dignity, he dispels the filth and replaces it with cleanliness, he modifies the conditions, he produces results.

In a recent conversation with a graduate of a leading school, he complained that the maximum fee he could command for removing a

putrid afterbirth from a cow was $1.50, because a competing cow doctor did it at that price. Questioning revealed the fact that they did the same kind of work. They went dirty into the filthy cow stable, wore dirty clothes for the operation, found the cow dirty, left her dirtier when they came away, were no cleaner themselves for their experience, and relied upon the antagonism between various forms of bacteria for disinfection. This is the type of veterinarian to which the argument of a poorly educated man for dirty work leads. The opinion was promptly and frankly expressed that he was receiving as high fees as his services warranted, and suggested that for better remuneration there should be exhibited a higher sense of cleanliness, of education and of culture, in harmony with his college teaching. Later advices indicate that the suggestion is being carried out with satisfactory results.

It has been further objected that a demand for such preparatory education would exclude many highly meritorious young men from the profession. Education of every grade, including veterinary science, is free in America, and there has not recently been a time when any healthy, intelligent young man could not acquire such learning as he desired. We have not known a young man who failed to get an education because of financial want. In every high school, college and university in the country there are plenty of young men and women who are earning their way and securing a good education.

It may be said with justice that the veterinary colleges themselves are not at this time fully prepared to give an education in harmony with the preparation outlined, but they will probably be able to adjust their work as rapidly as the preparatory requirements can be advanced.

If we search amongst the *alumni* of the various colleges it will be quite uniformly found that the most honourable and conspicuous positions are held by those who possess a liberal education.

If our current veterinary literature is examined it will be almost universally found that the meritorious articles emanate from those men who possess a good academic education.

Less than 50 per cent. of American veterinarians subscribe for any veterinary periodical, they purchase no new books, they attend no veterinary association meetings, they read nothing, they write nothing, they are *in* the profession, but not *of* the profession. Almost without exception they are the men without academic education—they do not have it because they are either too lazy or too dull. Yet the colleges and the profession are responsible for them.

It is charged that those colleges demanding high entrance requirements are not well patronised by students, and the charge is all too true, but the explanation does not lie in that alone or chiefly. High entrance demands are confined to State colleges or to those where the State has enacted laws making such requirements mandatory. The majority of these colleges have faculties greatly limited in numbers, handicapped by a want of practical experience; the buildings and equipments have generally been defective, their command of clinical material limited. Yet they are accomplishing a work destined to elevate and make better the veterinary profession, and as soon as the States conducting these institutions extend to them ample support, so that their college work may be made as good as their entrance requirements, the criticism will cease to have whatever weight it now possesses.

From the standpoint of the student all observation and recorded experience indicates that it is to his advantage that he acquire a liberal academic education before entering the veterinary or any other profession. If unfit to complete with credit a high-school course, he is incapable of taking an honourable place in veterinary practice. We speak of ours as a "learned" profession, but it cannot be so unless its members are educated. Admittedly a high academic education alone does not insure a successful veterinary career, nor does character or professional education. As stated at the outset the candidate needs the three in ample degree. We observe technically highly educated veterinarians who are failures for want of character or good common sense. On the other hand, it is claimed that men have succeeded as veterinarians who have had very poor academic preparation. But if those men are carefully studied it will be found that they have an equivalent knowledge which we should always accept. If the daily life of a man places him in constant contact with educated people, if he habitually reads good literature, observes and studies everything about him, he acquires a liberal education even though his school attendance may have been insignificant, and the fact that he has so acquired it, has become self-educated, is an indication of inherent vigour and power in him. It is the same with the course in a veterinary college; the worst diploma mill may occasionally turn out a man of force and efficiency, but the college did not make him; it merely failed to keep him from making himself. Schools, colleges and universities are not maintained because they are the only avenue by which men may get an education, but because they are by far the most efficient, prompt and economical. In reality the successful veterinarians are very largely self made, viewed either academically or professionally.

We hold that the colleges owe the public more efficiently educated men. In some callings a man learns his work through direct experience, but in doing so spoils little if any material, and merely accomplishes a small amount of work as an apprentice. When a man is graduated in veterinary medicine he should be prepared at once to do efficient service, but our practice has been to give the student some of the so-called fundamental principles and then turn him loose to learn the practical part at the pain of his patients and expense of their owners. One of the chief means for overcoming this defect is by securing higher preparatory education in order to enable him to better grasp his professional studies.

Opinion may vary and surroundings may change the advisability as to where and how this preparatory education should be obtained. The New York law permits students to enter with conditions provided they are passed off before the beginning of the second collegiate year. The plan has advantages and disadvantages. It offers advantages to mature and capable men who fall but little short of the requirements, and can make them up without serious hindrance to the efficiency of their work during their first year. If we regard preparatory education as an enabling provision through which he is better prepared to grasp his professional subjects, entering on condition destroys the value of such education at the very point where it is the most essential, for the first year poorly done is a handicap not removed during a college course. If the conditions are heavy the man who can overcome them and do his year of collegiate work well is a Hercules. Usually, in our experience,

heavily conditioned men stagger along in their first year; many of them fail, are forced out of college, and turn to colleges demanding low or no preparatory education; or, remaining, rarely recover during the entire course to a sufficient degree to do their work in a creditable manner. Except in case of very light conditions or in extraordinary instances our advice is against registration with conditions.

One method of securing the desired academic education is that adopted by the Kansas and Washington institutions, where they are taken as a part of the prescribed college course. To this no very great objection appears upon the surface. The state furnishes the education, both academic and collegiate, and if it can do it better or cheaper in the college than in the high school there can be but little objection. A minor criticism is that such a plan gives the appearance of a four-year professional course, when, as a matter of fact, it is shorter in veterinary study than some of the three-year colleges. A study of their curriculum reveals the true condition, and places them among the three-year colleges with high entrance requirements, where they properly belong.

In the New York scheme elementary chemistry may be counted as a preparatory study for entrance, or taken in college, and count towards graduation or serve the double purpose of counting in each place. It is a required veterinary study, and candidates for state license must pass an examination in it before the State board of examiners. Nevertheless, elementary chemistry properly belongs in a preparatory and not in a veterinary course. On the other hand, physiologic chemistry, the chemistry of foods, medicines, poisons, &c., have a direct and important place in veterinary education, and the elementary study must serve as a basis. Elementary chemistry is of scant value as a preparatory study, aside from affording a liberal education, except it is followed by the applied subjects. The same may be said of elementary botany and zoology. They lose their direct value as enabling studies, unless the professional courses use them as a basis for distinctively veterinary branches. High preparatory requirements become largely a farce, so far as they form a foundation for veterinary study, unless the studies for which they form the logical basis are given in a corresponding manner, but the high requirements still retain a value in contributing toward a liberal education, and indirectly enable the student to more successfully pursue his professional education and career. The solution of the problem of higher preliminary education for veterinary students is not easy of accomplishment.

The first step in securing any reform is a frank acknowledgment that it is necessary. If veterinary colleges would openly and earnestly advise intending students that it would be greatly to their personal advantage to secure a good academic education before entering college, it would go far towards solving the problem. If each and every college would say as much in their announcements about the advantages of a good preparatory education as they do to laud the excellencies of their buildings, courses, equipment and faculty, they would aid the advancement of veterinary education very greatly.

If this Association could bring about a general agreement that each college taking part in its deliberations should recommend through its official publications that the intending student should first secure a good academic education before entering college, it would exert an

excellent influence, even though such colleges continued to accept them without the preparation advised.

Our most influential force in this matter is the American Veterinary Medical Association. If we could induce this Association to approve a plan for the preparatory education of veterinary students which would be enforced by the granting or refusing of membership to the alumni of the college, it would go far toward the correction of the evil. A plan is now in force by an association of eastern universities by which entrance examinations are held at stated intervals by a board representing the association, and the results of such examinations are accepted alike by all universities belonging to the association, so far as they relate to a given subject. This does not prevent each university from admitting students upon examinations conducted by the individual institution.

The American Veterinary Medical Association could demand that a certain quantity and quality of preliminary education of veterinary students should be required by colleges in order that their alumni shall be eligible to membership, or it might enact a rule that only such persons who, as students, have passed a prescribed entrance examination shall, as alumni, be eligible to membership in the association.

A change from the present chaotic condition could be only gradually made. A start could be made by requiring a reasonable examination in English, to be followed as soon as judicious by a more rigid test, after which there could be added some of the sciences or a working knowledge of German or French, and finally, after some years, the full preparatory education suggested could be demanded. Such a plan would bring about a gradual change without serious injury to any well-meaning college, while it would appeal to the profession and public through the increased efficiency of the graduates. Presumably some low-grade colleges would continue just as correspondence schools and diploma mills now exist, but their influence is very slight and need not be seriously considered. In order to make such a plan effective it would be advisable to first have the support of a majority of the reputable veterinary colleges or of those colleges having a majority of the veterinary students.

It might not be essential to require that *all* students entering such colleges should pass such an examination by a central examining board, but if it were required of a majority of these it would create a sentiment in favour of such requirements which would act powerfully toward extending the rule, and making it universal for the college. It would soon be found that the men with good preparatory education were the successful students.

In such a plan a uniform minimum requirement could not be permitted to act upon those colleges already exceeding such demands. Those colleges already requiring high entrance education would necessarily be unaffected by this rule, except in some particular they fall short. If the requirements in English should be advanced beyond the demands of New York, those colleges would necessarily become affected by the rule; if German or French is required by the general rule, then New York would need comply or lose place in the association.

We believe that the time for action has come, and that this association should recommend to the American Veterinary Medical Association some prudent plan for advancing the matriculation requirements in veterinary schools, that the advance should be prompt and decisive, but not revolutionary.

Clinical Articles.

A CURIOUS CASE OF "BLOOD-POISONING" IN A SHEEP DOG.

BY T. HODGINS, M.R.C.V.S., KENSINGTON, AND ALFRED HEINEMANN, ROYAL VETERINARY COLLEGE, LONDON.

THE patient, a sheep dog, aged 6, was brought into hospital lame and said to be suffering from eczema between the toes. On examination it was found that the foot and leg to the elbow joint were in a very inflamed condition, and clearly pointed to "blood-poisoning." There was a small wound between the second and third digit, and after shaving and cleansing the part with a 1 in 500 chinosol solution and ether soap, the wound was thoroughly explored with the object of discovering the presence of any foreign body, but without success. The entire leg was now shaved and prepared in the same manner as the foot, and the patient given 2 grs. of morphia hypodermically. The leg was incised the whole of its length from toe to elbow but without exposing any foreign body. The knee-joint was considerably involved and producing pus. The tendons above the knee had commenced to necrose and it was found necessary to cauterise with a view of localising the necrosis. The treatment for the next few days consisted in dressing three times daily with a 1 in 1,000 perchloride of mercury solution and in packing the wound with cyanide gauze. After the third day another exploration was made, and about 2 inches above the knee a wild oat with bearded husk was discovered and extracted. It had evidently entered the limb between the toes and worked its way up through the connective tissue. The treatment with perchloride of mercury and cyanide gauze was continued and the patient made an uninterrupted recovery, and was discharged from hospital within three weeks.

QUEER CASES.*

BY W. A. BYRNE, M.R.C.V.S., ROSCOMMON.

ON looking over my *Lancet* on Saturday night last, I was attracted by the report of the Cavendish lecture, delivered before the West London Medico-Chirurgical Society on June 20, by Mr. C. R. B. Keetley, F.R.C.S. Mr. Keetley began his lecture as follows:—

"Set addresses and annual lectures are often so tedious that the question arises—would they not be improved by a musical accompaniment? In a fine opera the dulness of the *libretto* is never observed until it is read at home, without the singing or the orchestra. Therefore, well set to music, a lecture's defects might wholly escape discovery. Original airs would be no more necessary during a lecture than during a dance upon a tight-rope, which, indeed, it resembles, when the lecturer trips along the edge of some great question upon which pro-

* Read before the Summer Quarterly Meeting of the Irish Central Veterinary Association.

fessional opinion is divided, and is careful not to incline too much to one side or the other."

Great minds jump simultaneously, and I was pleased to find Mr. Keetley agreeing so thoroughly with our distinguished Honorary Secretary. At Limerick, last week, Mr. Howard suggested that my paper for this meeting should not be too heavy or too controversial; that something light and airy, which could be fittingly read to the accompaniment of the pleasant waters of the River Lea, would be grateful and comforting, and that veterinary politics, or the ponderous results of many weeks, "with blinded eyesight poring over miserable books," would strain your strenuous minds too sorely, and might not be appreciated.

Telepathy is such a queer thing, that one hesitates to indicate its limits, but I rather think Mr. Howard had some premonition of the subject that I had tentatively selected for my paper this evening. I had intended to allude to the anomaly of a Veterinary College "run" by a medical *General Practitioner*, and without any room on its Board of Governors for the Veterinary Profession as a profession; to the Veterinary Branch of the Department of Agriculture, which deliberately refuses to profit by the local knowledge and experience of its local inspectors, which has its farcical orders framed by an ignorant layman, and entrusts the direction of its veterinary work to a clerk; and to the moribund subject of Veterinary Dispensaries which, if run on the lines suggested, might benefit veterinary surgeons, but would tend to pauperise and degrade our people, and which are modelled on the very imperfect and very undesirable Poor Law Medical service.

However, I will hold over my remarks on these subjects for another day, and will now submit some queer cases for your consideration, in the hope that they will be of general interest and present some facet for mental articulation to everyone at this meeting.

I.—"The Labourer is worthy of his hire."

Shortly after I commenced practice in Ireland—now many year ago—I was summoned to a village 7 miles away to a case of difficult parturition. On arrival, I found that the cow had been in labour for over twenty-four hours, and that every "knowledgable" man and willing "gubawn" had exhausted his skill before I was called in. The cow was still very strong, but, as it was a first calving, I found the vulva and vagina torn and suppurating, and practically no room for manipulation, owing to the great swelling of the parts. I had had a great deal of experience in parturition all my life, and I was young and enthusiastic, but after six hours of almost superhuman work, I had to announce that I was beaten. I think it was a neck presentation, with the head and legs turned forward. I told the decent poor woman who owned the cow that I could not remove the calf in the ordinary way, but that if she liked I would cut the cow open, remove the calf through the side, and endeavour to save the animal in that way. She expressed her willingness to let me try my first Cæsarean section.

I drove home 7 miles, secured the kind assistance of my friend Mr. Philips, the local chemist—the nearest veterinary surgeon lived over 20 miles away—and having cleared out all his stock of chloroform

and antiseptics, I started back in the middle of the night, with another suit of clothes, and a fresh horse.

I chloroformed the cow, did Cæsarean section, removed the calf, sutured up the uterus and abdominal walls *secundum artem*, and left the cow resting quietly about five o'clock a.m. As I gathered up the few remains of the chemist's stock and prepared for home, the good woman of the house loudly announced: "I'm sorry I can't pay you to-night, Mr. Byrne, I have nothing less than a pound in the house, but I'll get small change the first day I'm in Roscommon, and I'll settle with you then." I had driven 28 miles, ruined two middling suits of clothes, paralysed both my arms, and created a famine in wholesale drug circles, but the poor woman had nothing *less* than a pound.

II.—Hernia of the Colon into the Gravid Uterus.

In April of last year I was called to a case of difficult parturition in a mare. The mare was dead on arrival, and a considerable portion of what I took to be the everted uterus was behind her as she lay—but she hadn't foaled. I carefully opened the mare, and found the foal in the normal position in the abdomen, and found that the colon had been forced against the wall of the uterus, so that this was invaginated into itself, forced through the genital passages, and so on to the ground, thus forming the large mass which I found behind the mare. There was no perforation of the uterus, the colon, or the vagina, and this mass contained nothing but intestine enveloped in uterine walls. The mare had been for a long time in violent labour, a rupture of the uterine attachments must have occurred during a paroxysm, and the displacement of the colon and its protrusion followed. The unprecedented feature of this extraordinary case is the fact that this occurred while the foal remained in its normal position in the abdominal cavity.

III.—Tetanus in a Bullock.

Last November I was called in to treat a bullock which had been badly castrated. A cursory glance showed a greatly enlarged scrotum presumably filled with pus, a common sequence to a quack operator and dirty instruments. Fortunately there was some delay in getting an antiseptic solution ready, and while waiting I examined the enlarged scrotum. Instead of the pulpy feeling I expected I found the sac quite tense, and pulsation with a peculiar thrill, and I did *not* stick my scalpel into it. The owner was a very poor man who could not afford to run the chance of a risky operation, so I bought the bullock, brought him home, and operated. The scrotum was carefully incised, and when dissected back a dark grey, tough sac was found obviously containing blood. This sac disappeared into the abdomen upon pressure, but regained its shape when the pressure was removed. The sac was stripped of scrotum as closely as possible to the abdominal wall, and then strongly ligatured with a double line of stitches, and removed. The portion of sac removed measured 16 by 8 inches. Its internal surface presented the characteristic white, smooth, shiny surface of the large blood-vessels. A plug of carbolic tow saturated with eucalyptus oil was applied to the ligatured surface, and the scrotum, drawn tightly over this, was enclosed in a large wooden clam. The clam was left on for three days, then it and the tow were removed, and the wound was regularly syringed out for a week. The bullock

was then sent out on the farm, but was brought back in a fortnight, as the herd thought he had a "murrain." He was then examined, and found suffering from tetanus in an advanced stage. He was put in, the wound was thoroughly washed out, and, as the jaws were immovably locked, he was fed directly into the rumen with a Toope cannula for three weeks. He was regularly treated with full doses of Anti-tetanin, and with belladonna and glycerine into the rumen. He gradually regained his health, and is, as I write, fat and ready for the butcher.

Was the sac in the scrotum an aneurismal sac? And if so, of what vessel? How was it caused? Does your experience coincide with mine, that Tetanus more frequently follows the application of a wooden clam than any other surgical instrument? I have had a good many cases of tetanus following the application of wooden clams, and every year I see cases of this disease in yearlings, following the application of clams by quacks in castrating.

IV.—Blackleg in Sheep.

On May 28, 1906, I examined a flock of 150 sheep, five of which had suddenly died. I found five unable to rise, with the crepitating, crinkling and smelling characteristic of Symptomatic Anthrax. The sheep had been recently shorn, and at first I thought they might be suffering from some form of blood poisoning. When large flocks are shorn, the men are expected to do a certain number every day, and, as a consequence of hurry, or want of skill in the shearer, some of the sheep get the skin gashed. I have frequently seen nasty suppurating wounds originate in a cut from a dirty shears. In the cases now under consideration though, the characteristic swellings did not coincide with skin cuts, and a microscopic examination of the affected parts enabled me to positively diagnose Symptomatic Anthrax.

I had no vaccine suitable for sheep, but I had some of Huish's blackleg cords for cattle, and on May 30 I inoculated nine very badly affected cases, giving a full cattle dose to each sheep. I really did this only as a desperate expedient, as all the nine were really bad, and two of them almost moribund, and the sheep vaccine had not reached me. Of the nine ewes inoculated, eight recovered, and I unhesitatingly ascribed their recovery to the curative effect of the anti-toxin. On June 2 the remainder of the flock was inoculated with blacklegoids, and no further deaths occurred beyond the ten which had died before any inoculation could be carried out.

V.—A Cat Case.

"Mickey," a three-parts bred Persian cat, the property of Miss Cust, was served on December 7. During January she was noticed thin with a voracious appetite, though her coat was sleek and she purred as usual. The membranæ nictitans were remarkable, being protruding quite half way over the eyes without being ever withdrawn. On January 27 she gave birth prematurely to three living kittens, which she was seen to eat. On February 10—her time now being up—she gave birth to two perfectly healthy kittens, which died when a fortnight old, apparently from the mother's neglect.

This cat was served again on February 28 and had four healthy kittens on May 5, all of which have since done well. One would hardly be justified in ascribing the peculiar condition of the membrana nictitans noticed in this case to the fact that the animal was carrying possibly injured kittens, as the same peculiarity was noticed subsequently in two pure Persian cats, one of which was a castrated male.

VI.—Mild Dose for "Dry Murrain."

Two fat hens boiled to jelly.
Three pounds very fat bacon.
Three ounces red aloes.
Three pounds treacle.
Three pounds salts.
About a pennyworth of ginger.

(By "Dry Murrain" we always mean impaction of the third stomach in Ireland).

This dose was given on June 28, and the owner of the cow came to see me on June 30 for a "strong dose" for his cow, as what she had got "hadn't moved her!"

VII.—Eudrenine and Blood Pressure.

A black four-year-old gelding with a small suppurating wound in the shoulder, approximately over the centre of the spine of the scapula. This case had been under home treatment for some months, and when the horse was sent to me for treatment, the owner ascribed the condition to a kick from another horse. On careful probing nothing could be found involving the underlying bony structures, so the external opening was enlarged, the wound curetted throughout its entire length and regularly syringed for some weeks. It healed up nicely and the horse was sent home after about three weeks' treatment. He went on very well at first, but was sent back to me in two months as the wound had broken out afresh. He was cast, the opening enlarged, and some loose spicules of bone removed. This proceeding had to be repeated in about a month, when some more particles of bone were removed. By this time both the poor horse and myself were thoroughly sick of the whole job. None of my men were willing to run the risk of sudden death which dressing the wound involved, and I began to get tired of being knocked down and kicked myself, so I determined to cut right down to the bone, expose a large area of it, and thoroughly examine it.

The horse was once more cast and chloroformed, and as previous explorations had been greatly interfered with by profuse hæmorrhage, 10 cc. of eudrenine mixed with 40 cc. of normal saline solution were injected at various places all round the wound. In ten minutes after the injection of the eudrenine the wound was thoroughly explored and a necrosed semi-detached spicule of bone found and removed. This necessitated a very large opening, during which a large vessel was severed. Owing to the hardened and adherent condition of the parts, I failed to tie this vessel, and though the wound was packed, and packed, and packed with dry tow, and with tow saturated with tincture of perchloride of iron, the bleeding could not be stopped and the

horse bled to death. Making every allowance for the interference of the ordinary contraction of a severed vessel, which the hardened tissues offered, in my opinion the uncontrollable hæmorrhage in this case was due to the constriction of the superficial small vessels by the eudrenine, and the resulting increase in the volume and force of those that were larger and more deeply seated.

VIII.—The Labourer is Still Worthy of his Hire.

The first of the queer cases I told you about to-night showed the financial benefit which very often accrues to the veterinary surgeon practising in a country district. He has very often to deal with the poorest of the poor, to whom the cow or the mare means all their worldly wealth, and when the patients die the veterinary surgeon generally gets no money; but he gets the blessing of the poor, and the grateful thanks of a grateful public. His landlord takes these instead of rent, and his grocer takes them instead of money, the veterinary surgeon lives in a happy state of blissful affluence, and we consequently have new members of the profession flocking to Ireland to share in the joys of this veterinary Arcadia. I fear I have taxed your patience very severely already, but I will only ask you to listen to one other queer case.

'Twas many years ago, when I got an urgent telegraphic summons to a town twenty miles from where I live. I went there by an evening train, and on looking up my correspondent, found him to be a small shopkeeper of whom I had never heard before. He told me that a friend of his, who lived in another county, had been in with him that day and asked him to telegraph for me, as he had a very bad case he wanted me to see at once. I got what I thought were sufficient particulars about the place where the friend lived, hired a postcar, and with a light heart, though supperless, started in a hurry through the summer rain in the direction of New York. We drove on gaily for some hours, until the jarvey's local knowledge and my patience were exhausted. We were then compelled to call at every village, awaken the honest toilers from their heavy sleep, and inquire the way to the residence of "the man with the sick horse"; and the rain fell steadily, forming pleasant pools under me on the jaunting car, the horse grew tired and commenced to stumble, and as the sleepy driver growled and swore and grumbled, I thought of the badly needed "fiver" that was sure to reward my long drive through the West. At length we approached a small cabin which I could not persuade myself was the end of my journey, till, after a vigorous fusillade at the lowly door, a querulous voice inquired if that was "the vit. at lasht." In the same breath an unseen colleen was ordered to "git up out of that now an' put in the foal." The house comprised a small room and a kitchen. The man of the house was raking the "greeshaugh" together to kindle the fire when I entered, and a little girl ran hurriedly past me to turn in the valuable sick animal to whose assistance the "vit." had been summoned from 40 miles away. It was a very small, badly-bred yearling colt, which might perhaps be worth £3, if horses were dear, and it had a nasty cut on the fleshy part of the shoulder which a ha'p'orth of tar would have healed perfectly in a week. My visions of a £10 fee had disappeared when I got amongst the cabins,

the fiver had become a sovereign when I halted before *the* cabin, and when the poor man, after exhaustive searching in many mysterious hiding places, produced 9s. 10d., principally in coppers, I went my 40 miles home a sadder, wetter, wiser, and poorer man.

DOGS AND THEIR LICENCES.

BY C. MACARA-FINNIE, BARRISTER-AT-LAW, LINCOLN'S INN.

In the Veterinary Journal of July last the conviction of a man for not having a licence for a dog which he was keeping for a friend was cited. This raises the interesting question as to what the liabilities of a veterinary surgeon would be under similar conditions. The law states that any person keeping a dog *must* take out a licence, and it is also very explicit about the fact that the said licence does not apply to any particular dog, and is not transferable with the dog. Moreover, any person in whose custody, charge or possession, or on whose premises an unlicensed dog is found or seen, is to be deemed the owner of that dog, unless he can prove the contrary.

Now all this applied in the case which was quoted, but, looked at from the veterinary surgeon's point, it seems different. For a veterinary surgeon takes in a dog for another person either to treat it professionally, or even, maybe, to kennel the dog for its owner. In either case the veterinary surgeon becomes, for the time being, and with respect to that dog, the agent or servant of the owner of the dog, since he is appointed and paid by the owner for that purpose. Now the servant is not liable for his master, so, whether the dog is or is not licenced does not, as far as I can see, affect the veterinary surgeon, since the owner of the dog, and not the servant of the owner (in this case the veterinary surgeon) is liable for the dog's licence.

Reports.

STOCK INSPECTION METHODS IN NEW ZEALAND.*

Report on the Work of the Veterinary Branch.

BY W. J. COLEBATCH, B.Sc. (AGR.), M.R.C.V.S.

Prior to the enactment of the Slaughtering and Inspection Act, 1900, the veterinary division of the New Zealand Department of Agriculture had to depend for its efficiency upon a total staff of from four to eight officers, and of this number three only were qualified veterinarians. In 1901, however, fifteen members of the Royal College of Veterinary Surgeons were appointed from Great Britain, and, in addition, five local veterinarians (qualified) were induced to join the division. The purpose of this reorganisation of the Department was to provide for strict inspection of all methods and practices in vogue at public and

* From the *Journal of the Department of Agriculture of Victoria* (Australia).

private abattoirs and meat works. It is abundantly proved that as far as this function is concerned the efforts of the inspectorial staff have been signally successful. Further, in connection with stock and dairy inspection, and particularly in actual field work amongst the farmers themselves, the Government veterinary officers have so far proved their worth to the colony as to win the encomiums of the public and Press. These facts are cited to show that the introduction of trained men into the colony has resulted, not only in accomplishing the specific purposes in view, but also in rousing the farmers and pastoralists to a keen sense of their responsibilities in regard to the care and treatment of all classes of live stock.

In New Zealand, as in all young colonies, the natural spirit of self-reliance that arose from sheer force of circumstances, and formed so essential a characteristic of the successful pioneer, gave birth to an unreasonable sense of antipathy towards scientific measures and their exponents. To break down this misguided opposition, and thereby to pave the way towards the harmonious co-operation of farmers and veterinarians in the eradication and prevention of stock ailments, has been the arduous yet pleasing duty of these officers. The advantages which have already accrued from this source, namely the education of the farmer to a knowledge of his requirements, have in themselves more than justified the expenses incurred through the expansion of the veterinary staff.

In his last report to the Secretary for Agriculture, Mr. J. A. Gilruth, M.R.C.V.S., Chief Veterinarian, states that the total expenditure for the year 1905-06 was £16,400, and of this sum nearly £8,200 was recovered in the form of meat-inspection fees. It seems, then, that the total cost to the country of this division of the Department of Agriculture is just about £8,000 per annum. When consideration is given to the diagnostic and investigational work carried out at the Wallaceville Laboratory, the protection afforded the public by inspection of abattoirs, dairies and milch cattle, the educational work conducted by the staff from Auckland to the Bluff, and finally, the enormous benefits conferred on the dairy farmer and cattle grazier by the preparation, distribution, and application of blackleg vaccine, it is clear that this amount is in no sense proportionate to the advantages derived from its expenditure.

The following particulars regarding the staff as now constituted, are taken from the Chief Veterinarian's latest statement.

Veterinary Surgeons—			
At headquarters	2		
On field work	5		
Inspectorial work	19		
		—	26
Meat and dairy inspectors			10
Assistant inspectors			19
Clerical and laboratory staff			7
			—
			62

The main functions of the Department may be briefly stated as follows:—

The inspection of public and private abattoirs and of meat

export factories. The Department also urges the erection of public slaughter-houses on conservative councils, and controls the management and sanitation of them. Stock inspectors attend sale yards, farms and factory yards for the purpose of culling all animals affected with a notifiable disease. In the majority of the meat works and abattoirs a further *ante-mortem* examination is carried out by the trained meat inspectors and their assistants immediately prior to slaughter. The slaughtering and exenterating operations are, as far as possible, performed under supervision, to provide against the possibility of substituting healthy for diseased viscera.

In many of the smaller factories special equipment is supplied to meet the difficulty; by this means the carcase and the viscera are placed either side by side, directly opposite or in some other constant relationship, till the final inspection has been made. Any attempt to mislead by referring entrails to carcases with which they have no connection is met with a heavy penalty.

After being washed with clean water each animal is closely inspected in the following manner:

(*a*) Facing the abdomen, the inspector passes his hand over the thighs, stifles, flanks, inspects the inguinal area, opens the slit abdominal wall, and rapidly glances at the condition of the pelvis, loins, kidneys and kidney fat, peritoneum, diaphragm or "skirting," and the pleura or chest lining. Next he runs his hands down over the elbows and in front of the shoulder joint. In this way he includes the chief lymphatic glands of the body, viz., popliteals, precrurals, inguinals, lumbars, thoracic, prepectorals and prescapulars, in his system of inspection. The cervical or neck region completes this part of the work.

(*b*) Facing the back, the inspector passes his hands from tail to neck to test the condition, and at the same time to satisfy himself as to the absence of bruises, deep-seated abscesses, discolourations, and as to the general quality of the meat.

(*c*) The inspection of the viscera is very carefully performed in the case of suspected or diseased carcases, and in a more cursory fashion in all other cases. Removal of viscera to avoid inspection is rewarded by rejection of the whole carcase. Each carcase as rejected is branded and set aside for more detailed examination later on. It is then either wholly condemned or else the diseased parts are separated and the remainder "passed."

(2) The investigation and diagnosis of outbreaks of disease, as well as the instituting of preventive and suppressive measures in the case of epi- and en-zootics.

(3) Experimental research is also conducted as opportunity offers.

(4) *Field Work.*—A proportion of the staff is distributed throughout the chief agricultural districts in order to carry out prophylactic measures in regard to black-leg, tuberculin inoculations, to demonstrate the Departmental methods of dealing with contagious abortion, milk fever, and contagious mammitis, and to keep a sharp look out for any disease—sporadic or infective—which is likely to require consideration at headquarters. These are the officers who, by skilful and scientific methods at the steading or in the paddock, have brought home to the farmers the value of rational remedies.

(5) *Lecturing.*—This branch of the work has been given a prominent

position in the official programme, but though prosecuted with unwearying diligence, the results have not been wholly satisfactory. The opinion of Mr. Gilruth is not in favour of free lectures; he finds from experience that better attendances are insured if a small fee—say five shillings for the course—be levied. However, it should be noted that no examinations were held in connection with the New Zealand classes, nor were any certificates or other form of inducement offered, as is the case in Victoria. Probably, also, the extraordinary prosperity of the country has, to a certain extent, diverted the attention of the farming community from the manifold advantages to be gained from veterinary instruction. It is only fair to add that some excellent veterinarians are naturally unfitted for this particular class of work. Personally speaking, I am strongly of opinion that no great good can be accomplished by any lecturer who does not take occasion to demonstrate clearly and forcibly in the field that his scientific utterances are worthy of every attention from the practical farmer. He must come out from behind the lecturing desk, and actually perform the work which he has prescribed and explained. Having gained the respect and confidence of his audience in this way—and he can do so by no other means—his explanations and words of advice will be received with gratitude and credence. Where this idea can be adopted I am convinced that neither class fees nor examinations are essential to success.

(6) *Inspection of Dairies.*—This has only been spasmodically performed, owing to the lack of available officers. On several occasions efforts have been exerted to place this important work on a satisfactory basis, but so far without avail. Compulsory registration and routine inspection are still amongst the ambitions of the Department, so that Victoria has nothing to learn, at present, from New Zealand as far as veterinary inspection of dairies and dairy farms is concerned. In a few instances the inspectors at abattoirs act as local dairy inspectors, but there is no general scheme yet in vogue for the whole colony.

A consideration of the system of dairy supervision that obtains in Victoria brings up the question of the relative advantages and disadvantages of establishing a numerically strong qualified staff of veterinarians by colonial governments. Under some conditions this has proved a most unwise procedure; but in New Zealand, thanks to the enormous development of the frozen meat trade, the circumstances are exceptionally favourable. With an industry of this nature, careful inspection by trained men was an absolute *sine quâ non*—in fact, the companies would in any case have imported their own inspectors to secure the confidence of the public. The opportunity, therefore, of establishing and maintaining a powerful veterinary department was almost without a parallel in the history of the British colonies, and New Zealand was peculiarly fortunate in having a man with Mr. Gilruth's perspicacity and force of character to grasp the situation and initiate the movement. Were the whole burden of such a staff to be borne by the ordinary taxpayer, it is not difficult to see that such a system is apt to break down, and it would be courting failure to attempt to run a similar department unless some means of defraying the cost is devised. Why New Zealand should be exporting 1,750,000 cwt. of mutton per annum, and the whole Australian Commonwealth only 600,000 cwt., is by no means so clear, more especially as the Australian lamb and mutton—to a very large extent grass fed—are on the

London market six to eight weeks earlier, and, moreover, the New Zealand sheep are almost invariably fattened, or at least "topped off," on such expensive forage crops as rape, kale, turnips, and mustard. Perhaps when the Australian farmers are more alert to the importance of the sheep-raising industry the freezing trade will expand as it has done across the water, and therein may arise an emphatic demand for the appointment of a numerically strong staff of veterinary officers.

It is interesting to record the fact that the New Zealand Government has so far recognised the necessity of keeping in close touch with scientific progress in Europe as to grant, at intervals, to the chief of the division, sufficient leave of absence to enable him to visit the chief British and continental laboratories, and to keep in personal contact with the leading savants of the Old World.

VETERINARY WORK IN THE PUNJAB.

THE local Government's review of the report on the civil veterinary administration of the Punjab for the year 1906-1907, states that the receipts of the Lahore Veterinary College show an increase of Rs. 2,000 on the previous year, chiefly in fees, but there was also a heavy rise (Rs. 11,000) in contingent expenditure. The canine ward brought in Rs. 800. One hundred and eighteen students were admitted, and 287 remained at the close of the year, as compared with 215 in the preceding one. The educational qualifications of the students admitted were good, including knowledge of English in eighty-five cases, as against twenty-six last year. Sixty-three candidates passed the final examination out of seventy-eight, a percentage of 80; the percentage of success in the other two classes being 90 and 89 respectively. It is interesting to observe that over 60 per cent. of the students are Mahomedans.

All the graduated students obtained employment. The percentage of passes continues satisfactory, and the report of this year reflects credit on Major Pease and Captain Smith.

As regards the provincial Civil Veterinary Department, the most notable feature of the year is said to have been the formation of a new circle, including the North-West Frontier Province; but the advantages of the new arrangement have been seriously discounted by the inability of the department to supply properly qualified officers to the third circle. This defect is probably only temporary, but the Lieutenant-Governor recognises the very serious impediment to the efficiency and progress of the department which is involved in the absence of officers accustomed to the people and acquainted with the vernacular of the province, quite apart from the inconvenience and overwork entailed on the Chief Superintendent. A scheme for reorganising the cadre and work of Veterinary Assistants was worked out and sanctioned during the year. It is intended to replace the itinerating assistant at each tahsil by a stationary one, leaving one assistant to tour through the whole district. The proposed system is, no doubt, open to the objection that it is difficult to bring in sick animals to the tahsil for treatment, but it was thought that this objection is more than balanced by the ease with which it will be possible

to secure the services of the Tahsil Assistant on the occasion of neighbouring outbreaks, and by the knowledge where he will be found whenever it is necessary to find him. The local Government has made an assignment of one lakh of rupees per annum for five years to district boards to be spent on veterinary objects.

Deaths from Disease.

Deaths from contagious disease (in non-selected districts) among equines fell from 135 to thirty-eight, the only noticeable outbreak being one of surra in Montgomery. The number of recorded deaths among bovines, on the other hand, rose from 10,000 to 17,000. Rinderpest was rife in Karnal, Kangra, Ferozepore and Montgomery, and carried off almost 8,000 animals in the province, as compared with 4,000 last year. There was also a large rise in the deaths from hæmorrhagic septicæmia, and black-quarter destroyed over 1,100 animals. A vigorous campaign of preventive inoculation, attended by a considerable measure of success, was carried on against the three diseases last mentioned, the number of animals so treated rising from 57,000 to 110,000. The Lieutenant-Governor is glad to see that the agricultural population is beginning to appreciate the value of scientific treatment, and thinks that the increased confidence in the department reported by Captain Walker is most creditable, both to his supervision and to the tact and good work of his subordinate staff. The breeding operations call for no remark beyond the statement of the fact that the supply of donkey stallions still remains considerably below the requirements of the Province.

Sir Denzil Ibbetson considers that the progress of the department has been well maintained during the year under review, and wishes to record his appreciation of the excellent work done by Captain Walker. He also desires, now that Major Pease has finally left the Lahore Veterinary College, to express his high appreciation of the admirable work done by Major Pease during his long connection with that institution, and of the high standard of efficiency to which he, assisted by an admirable staff, both European and Indian, succeeded in raising it.

(*Pioneer.*)

REPORT OF THE COMMITTEE ON INTELLIGENCE AND EDUCATION.*

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For the last few years your Committee on Intelligence and Education has published statistical statements and descriptions of the work of the various veterinary schools in North America. These statements have furnished information that has been drawn from the catalogues of the various institutions, from replies made by representatives of the institutions in response to inquiries from your committee, and reports from members of this Association appointed to visit the different

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schools. From the information obtained through these and other channels, each member of the Association, and every progressive veterinarian of the United States, must have a fair conception of the quality of the work that each school is prepared to do, and he must be informed, in a general way, as to the kind of work that each school is actually doing. On this account, no effort has been made to obtain and to detail statistical information in regard to the schools. In fact, it is scarcely possible to obtain information of real value, in addition to that which is already contained in the records of the recent meetings of the Association, without going to the expense of sending around to all of the schools an impartial visitor. This expense your committee was not authorised to incur.

It is, therefore, assumed that the present status of the schools is well known to you. This assumption will obviate the painful necessity of considering each of the schools separately, with the view of pointing out its excellencies and its defects. Such a duty would, indeed, be a painful one, because the defects so enormously outweigh the excellencies. Without entering, in this report, upon a criticism of individual schools, it is proposed to outline, briefly, the organisation, equipment and budget of what might be termed an *adequate* veterinary school; that is to say, a school organised and equipped to conduct its work in a way that would adequately comply with the proper demands upon such an institution, and thus to furnish a standard for measuring each school.

The outline that follows is not Utopian, nor is it even ideal, but it is intended to be of such a plain, business-like statement as might be prepared in response to a request to furnish a sketch of what is needed in order that the veterinary sciences may be taught in an adequate manner and in a way that is proportionate to the needs of the country, and in harmony with the development of modern, technical, and professional schools. With such an outline, each member of the profession can measure the efficiency of a given school, and the relative merits of different schools can be compared.

A veterinary teaching institution may naturally be divided into three parts:—

The teaching body.
The material equipment.
The student body.

(1) The Teaching Body.

The faculty and the subordinate teaching staff may, naturally, be divided into groups according to the subjects taught. The following is suggested as an appropriate classification of the subjects of instruction, and hence of the work of the teaching body:

Anatomy.	Surgery.
Physiology.	Medicine.
Pathology.	Animal engineering.
Hygiene.	

It is proposed that all of the various branches of instruction shall be grouped under the above general headings. In more detail the classification would be as follows:—

(1) *Anatomy:*—Histology, embryology, biology, zoology, statics and mechanics.

(2) *Physiology* :—Chemistry, principles of nutrition, physiological action of drugs, materia medica, medical botany, pharmacy.

(3) *Pathology* :—General pathology, special pathology, morbid anatomy, pathological histology, *post-mortem* examinations.

(4) *Hygiene* :—General hygiene, special hygiene, including immunity, bacteriology, meat inspection, milk inspection, dairy farm inspection, epizootiology.

(5) *Surgery* :—Surgical anatomy, surgical diagnosis, surgical pathology, operative surgery, horse-shoeing, obstetrics, clinics.

(6) *Medicine* :—Physical diagnosis, laboratory diagnosis, principles and practice, special therapeutics, clinics.

(7) *Animal engineering* :—Animal production, breeds of animals, breeding of animals, judging animals, stock farm management, hippology, meat packing and manufacturing, dairying, &c.

For their full development a large number of men could practically be employed in each of the above departments. It is not proposed to outline a classification to provide for research, but only for the practical work of veterinary teaching. With this in view, it appears that each of these departments should be taken care of by one professor and two assistants. This calls for a teaching force of twenty-one men. Undoubtedly all of these teachers should devote their best energies to the work of the school. If they were permitted to accept outside employment, it should be only in the line of the subjects taught, and should be limited in amount. The professor at the head of each of these departments should receive a salary of not less than $3,000 ($3,000 to $5,000); the first assistant should receive a salary of not less than $1,800 ($1,800 to $2,500), and the second assistant should receive a salary of not less than $1,200 ($1,200 to $1,800). Therefore, the minimum charge for the salaries of the teachers in each of the seven departments amounts of $6,000 a year. It is manifest that adequate work cannot be done for less, because it is impossible to conceive of the branches enumerated being properly taught by a smaller staff; no branch enumerated is superfluous, and the salaries which form the basis of this estimate are minimum salaries, as measured by salaries now ruling for teachers engaged in more or less similar work in universities and agricultural colleges.

(2) Material Equipment.

An adequate veterinary college must have a school equipment and a hospital, or clinical, equipment. The school equipment must comprise facilities for teaching all of the subjects, excepting clinics, under the seven headings. This calls for class rooms, laboratories and illustrative material. In order that the work may be conducted without interruption and delay, it is necessary that separate facilities shall be provided for teaching the different groups of subjects. For example, in the department of anatomy there must be a dissecting room and one or more laboratories in which histology, embryology, and biology may be taught. In the department of physiology there must be one or more laboratories for practical physiology, chemistry, toxicology and pharmacy. In the department of pathology there must be facilities for making post-mortem examinations, and there must be a well-equipped laboratory for giving instruction in pathological histology. In the department of hygiene there must be a laboratory

for bacteriology and for teaching certain parts of meat and milk inspection. In the department of surgery there must be ample facilities for clinical and practical instruction. In the department of medicine there must be opportunity for clinical instruction, and for laboratory instruction as well, in relation to clinical examination and the newer and more scientific methods of diagnosis. In the department of animal engineering there must be a laboratory and workroom where students may be drilled in the examination and classification of food stuffs, and of the various animal products, and in the study and tabulation of pedigrees. In connection with hippology a collection of the various kinds of harness, bits, saddles, &c., together with facilities for adjusting and for illustrating the usefulness of the various constructions. In teaching the breeds of animals, the principle of breeding, judging animals, stock farm management, &c., it is difficult to see how the work can be done properly without the use of a well-equipped stock and dairy farm. There must also be a well-equipped library, and each of the departments will need to have its own museum collection.

Without going into the details of the physical arrangement and the cost of such an equipment, which would depend largely upon local conditions, it may be said that the total cost could scarcely fall below $350,000. The cost of maintaining such an equipment, and of supplying the various material needed for class instruction, would amount, upon a minimum basis, to $33,000 a year. This amount, added to the teachers' salaries, makes a total of $75,000 a year as the least cost of maintaining an adequate veterinary school.

(3) The Student Body.

In order that the teaching that is here outlined may be taken advantage of, it is necessary that the students shall come to the school as well prepared educationally as are the students entering upon other lines of scientific work of college or university grade. The general standard for students entering upon work in medicine, law, engineering, agriculture, &c., throughout the United States, is the equivalent of a high-school course covering four years. It would appear that such a standard might properly be accepted in this connection. If the standard of admission were lower, the grade of the work of the school would be cast upon too low a plane. If the standard were higher, it would be too far in advance of the generally accepted standard for technical colleges in this country.

The duration of the course of instruction should be four years of nine months each.

It appears, then, that a veterinary school must have an equipment that cannot be provided for less than $350,000, and that it must have a budget of at least $75,000 a year, if it is to be prepared to teach the veterinary sciences as thoroughly as is required by the needs of the public and the student. Such a school could teach 200 to 300 students.

At first sight these estimates may seem to be large, because, in this country, veterinary education has never been organised on anything like an adequate basis, and we have naturally fallen in the way of judging the subject by what we have, rather than by what is needed. If it is agreed that all of the subjects enumerated are necessary in the

equipment of a modern veterinarian—a man prepared to meet satisfactorily the technical demands that properly fall upon the veterinarian of the present day—and if it is admitted that teachers cannot be compensated for the services required of them at salaries less than those stated, and that the material equipment described cannot be restricted excepting at the cost of efficiency, then it must be admitted that the total estimate is a minimum estimate of the cost of equipping and maintaining an adequate veterinary school.

By using this outline as a standard, one can determine to what extent the best of the American veterinary schools fall short of what is actually needed. In making such a comparison, however, it should not be based alone upon the budget of the school it is desired to measure, but rather upon the facilities for instruction and upon the actual grade of the work done, as compared with the work one could fairly expect from an institution organised in accord with the above outline. The reason for this is that some of our American veterinary schools are blessed by having among their teachers men who receive small salaries, or no salaries, but who work as faithfully, and as diligently, and as effectively as though they were receiving adequate compensation for their services. A man who does this contributes to the school, in effect, the amount equivalent to the difference between what he receives for his services and what they are worth. There are veterinarians with the zeal of missionaries, who, in this way, contribute annually from $500 to $2,500 worth of services to the institutions with which they are connected. If institutions are compared by their budgets, the value of contributions in service must not be omitted from the total of the income and disbursements of the institutions.

The standard for a veterinary school as outlined is similar to the standard in most of the countries of continental Europe. Many of the European schools, however, have equipments far larger than the equipment here outlined, and their incomes are also much greater than here proposed. The equipment of the schools at Berlin, Hanover, Munich, Dresden, Budapest, Vienna and Alfort could not be duplicated in this country at an expense of less than $1,000,000 to $1,500,000. If European countries have found, after a century of experience, that these expenditures are justified—and they must have found that they are justified, because they are continually being increased—there can remain no doubt that similar expenditure in this country would be completely justified by the results they would render possible.

An argument of this sort is frequently met by the statement that one must not expect too much, for "the veterinary sciences are young in this country," and that we cannot be expected to have as complete institutions for promoting these sciences as exist where they are older. Such a statement is based upon a misconception of the facts. Science is international, it knows no political boundaries. The discovery of the tubercle bacillus is as old in the United States as in Germany, where the discovery was made. The facts of anatomy, of physiology, and pathology, are as old here as in their original home, and so with all the elements that enter into the complex group known as the veterinary sciences. And since this is true of the parts, it is true of the whole. The veterinary sciences are of the same age in this country as everywhere else upon the earth. It is only the public recognition of the value of the veterinary sciences that is young and immature. Closer

attention, in the light of the above statement, will show that, while the veterinary sciences in this country have the appearance of having the immature stature of a boy, in reality they are comparable to the ill-nourished, dwarfed old man. The veterinary sciences do not lack age —they lack development.

We will next consider the relation of the quality of the facilities for veterinary education to the status of the veterinary profession.

In the long run, veterinarians will find themselves occupying the fields that they are better fitted to occupy than are men trained in other lines and in other schools. The future of the veterinary profession in the United States, as elsewhere, depends upon the ability of the veterinarians to render useful and needed service. If veterinarians aspire to any given fields of work, it is necessary that they shall be the best equipped to occupy that field.

It is illuminating, but at the same time depressing, to run over the list of the seven departments of the veterinary sciences, as given above, and inquire, as we proceed, how many American veterinarians are entitled to high rank in these various departments or their sub-divisions. For example, in pathology, a subject that underlies medicine, as anatomy underlies surgery, how many veterinarians in the United States are entitled to high rank? This field is the most important within the whole domain of the veterinary sciences; it is the one upon which the most typical and most important of our veterinary work pivots. The *post-mortem* work of the meat inspector is applied pathology, the diagnosis and treatment of diseases depend upon knowledge of pathology, the knowledge necessary for the recognition and control of animal plagues depends principally upon a solid foundation of pathology.

If we search for the leading men in the bacteriology of the diseases of animals, how many do we find in the ranks of the veterinary profession? Where do we find the most complete, the most reliable, and the most practical knowledge of the principles and practice of animal nutrition—a department of comparative or veterinary physiology? Where do we find expert knowledge and professional skill upon subjects pertaining to animal husbandry, and who are the recognised authorities in this field?

If a national meeting is called for a scientific discussion of milk and dairy inspection, what percentage of the authorities on these subjects rank as veterinarians? If one searches the literature for the solid facts upon the bacteriological, microscopic and chemical investigations of the milk supply, how many veterinarians does he find among the authorities of the first rank? If one wishes the best instruction in this field, would he go to a veterinary college? If so, to which one? Or would he go to a school in dairying in connection with an agricultural college?

In meat inspection, the veterinary profession is confronted by one of the most important crises in its history. The federal Government has increased its system of meat inspection until it now costs about $3,000,000 a year. The federal meat inspection covers less than one-half of the meat supply of the United States. The larger part of the meat supply is under very little inspection. A few states and municipalities have organised, somewhat tentatively, small meat inspection services. In many places the authority of the veterinarian in this

work is not recognised, and men of little or no training are appointed to occupy positions as meat inspectors. This means that the local meat inspection work will give unsatisfactory results, and that it will not develop as it should. The failure of local meat inspection services "to make good," and to develop, will inevitably have an effect that is not commonly appreciated upon the federal meat inspection service.

The cost of the federal meat inspection service is paid by the individual citizens of the United States; the cost of the state and municipal meat inspection service is paid by the same individual citizens of the United States. To say that one is paid by the national Government, and the other by the state and municipal governments, is to establish a distinction that is not real, for, in the end, all taxes, whether general or local, are paid by the people of the country.

Pennsylvania has about one-twelfth of the population of the United States, therefore one-twelfth of the cost of the federal meat inspection service, $250,000 a year, is paid by the people of Pennsylvania. The people residing in the other states pay their share of the cost of the federal meat inspection service in similar proportion.

How can a given community, or given individual, be expected to continue indefinitely to pay for the inspection of a part of the meat supply, and to ignore the inspection of the remaining part? The individual, the community, and the groups of individuals and communities that make up the nation, must ultimately depart from such an illogical position, and come to the conclusion that meat inspection *is worth having or that it is not worth having*. If it is worth having, then all of the meat must be inspected. If it is not worth having, there is no reason why that part of the supply that is prepared in one state for sale in another shall be inspected and the inspection of the remaining part ignored. This means that local meat inspection services must be developed, to take care of the inspection of that part of the supply that is not inspected by the agents of the federal government, or, if this is not worth while, then it is not worth while to continue to spend large sums for the maintenance of the federal meat inspection service. In other words, municipal, state, and federal meat inspection services must prove their worth and be developed together, or they must fall together. To those of us who believe that meat inspection is of large sanitary importance, there can be no more important task than to assist in the development, along proper lines, of local meat inspection services. If such local meat inspection services are placed in incompetent hands, and are developed along improper lines, or are not developed at all, then the end of the federal meat inspection service is ordained.

The federal Government has placed all positions of independent responsibility in the meat inspection service in the hands of veterinarians, but it has engaged for duty in certain parts of the service a large number of men who are not veterinarians, but who are taken from the ranks of practical butchers. To these men it has given the title of meat inspector, in contra-distinction to their superiors in office, who are known as veterinary inspectors. This new classification and nomenclature has led to much confusion on the part of the public. There is in some places a common and natural impression to the effect that the meat inspection work of the Government is no longer conducted by veterinarians—for are not the "meat inspectors" laymen? It is not recognised that the officials termed "meat inspectors"

are really meat inspectors only in the most limited sense, and that the important technical work of meat inspection is not done by the so-called meat inspectors, but by the veterinary inspectors. In order that the confusion on this point, which is widespread, and which threatens to lead to serious consequences, may be removed, it is important that the official termed "meat inspector" shall be given some other and less confusing title: "assistant to the veterinary inspector," "meat classifier," or "grader of meats."

Localities organising meat inspection services cannot be expected to recognise the fine distinction, under the present federal nomenclature, between the office of veterinary inspector and meat inspector, and thus the organisation of local services on proper lines is hampered.

On the other hand, the veterinary schools must prepare men, not only for the most important part of the work of meat inspection—that based on a knowledge of pathology—but for every possible subdivision of the whole meat inspection field.

The subject of dairy inspection is coming rapidly to the fore. There is likely, in the near future, to be as much, and very likely more, development in the line of dairy inspection as in meat inspection. Among veterinarians it is commonly accepted that the sanitary supervision of dairy farms and herds is naturally veterinary work. There is much to be said in favour of this view. Wholesome milk depends, in the first instance, upon the health of the cows that produce it, and upon the sanitation of their surroundings. So far as the health of cattle is concerned, veterinarians are, of course, the natural experts, but in relation to the sanitation of dairy premises there is much difference in opinion, and veterinarians are not commonly accepted as the authorities in this field. The training that veterinarians receive in hygiene, their knowledge of the bacteriology of milk and of the sanitary sciences, ought to make them as conclusively authorities in dairy farm sanitation as they are with regard to the health of dairy cattle. But that this is not recognised is shown by the fact that under the recently developed plan for the sanitary inspection of the farms and herds producing milk for New York City (this inspection is to cost $160,000 a year) there is no special provision for the employment of veterinarians, and, unless the plan has recently been materially revised, very few veterinarians will be employed in this work. These inspectors are to be practical dairymen trained in dairy schools.

This important and rapidly developing field can be occupied by veterinarians only when it can be shown that men are thoroughly trained in veterinary schools in work of this character, and when it can be shown that the training in this line that is given in veterinary schools is more complete, and furnishes a technical equipment of higher quality than may be elsewhere obtained. In other words, if the veterinary profession is to be given this work to do, the schools must greatly strengthen their courses in dairy-farm sanitation and in milk hygiene.

Much might be said as to the outlook for veterinary work in many lines related to "animal husbandry." There is much to be done in the development of the animal husbandry of the United States that involves profound veterinary knowledge, but in order that men trained as veterinarians may be given an opportunity to exercise their veterinary knowledge in this field, it is a pre-requisite that they shall have

as complete training along animal husbandry lines as is furnished in the best agricultural colleges.

It is a trite saying that "a stream can rise no higher than its source," and unquestionably this is true in relation to the professions. No profession can rise higher than the schools in which its members are trained, as these are the sources of the special knowledge, the grasp and the ideals of the profession.

So long as men must go to institutions other than veterinary colleges to obtain the best obtainable training in many of the fundamental subjects that enter into the veterinary sciences, the veterinary profession cannot be said to have a very secure hold on its field, and it cannot advance as it should. Moreover, it is in constant danger of losing part of the ground that it has already occupied. If the veterinary profession is to rank with other learned professions, the average of intelligence and of professional knowledge must be as high as the average intelligence and professional knowledge in other professions. This means that the schools must be as good as the schools of medicine, law, engineering, and agriculture.

We must have good facilities for teaching men, unless we are to be satisfied with a lower standard for our profession than the standard that prevails in other professions. Such facilities cannot be provided without means. The amount of money that is required to equip and maintain a veterinary school on a basis equivalent to that of other professional and technical schools has already been indicated. The next question is how this money may be obtained. It is manifest that it cannot be obtained from tuition fees. A veterinary college maintained wholly by the fees of its students may do excellent work so far as it goes, but its field will ultimately be limited by what the students can afford to pay for. It has been found by experience that schools of medicine, law, engineering and agriculture, &c., and the general scientific and classical courses of the colleges and the universities of the country, cannot be sustained by tuition fees alone. Higher education cannot be self-supporting. The college of medicine, for example, that is subsisted entirely by students' fees, cannot do its duty to its students. It cannot adequately train men for the responsibilities of the present-day physician.

I have in mind a medical college that is carefully and economically administered that has 500 students, each paying an annual tuition fee of $200. This college receives the services of a large number of capable men at a minimum salary, in addition to specialists who devote all of their time to the college, and who are well paid. But the tuition fees fail to equal the current expenses of the college by from $25,000 to $35,000 a year.

Colleges of agriculture in the various states receive public funds for current expenses amounting to from $40,000 to $200,000 a year.

In the past, and to some extent now, unendowed veterinary colleges have given to their students much more than the students have paid for, through the public-spirited, generous contributions of time and effort by the teachers; but this sort of self-sacrifice cannot be expected to continue indefinitely. In the long run the efficiency of a school will be in more or less direct proportion to the income of the school.

Institutions of higher education in the United States derive their income, in excess of tuition fees, from three sources: from gifts from

individuals, from the public funds of the states in which they are located, and from the federal treasury. Thus far veterinary schools have not appealed very successfully to benevolent individuals. One veterinary college in an Eastern state has received contributions from individuals amounting to about $250 000. A newly planned veterinary college in a central state is said to have received a donation of from $200,000 to $300,000 from a group of individuals interested in the livestock and packing industries. Not more than one half-million dollars in all has, thus far, been received, or promised, to veterinary colleges from private sources.

A number of states have taken some part in the development and promotion of veterinary knowledge by making appropriations for the equipment and maintenance of veterinary schools. The State of Pennsylvania, during the past two years, has appropriated $200,000 for the construction of a building for a veterinary school. The State of New York has appropriated $150,000 for the construction of a building for a veterinary school. The State of Ohio has appropriated $60,000 for a similar purpose, and a few other states have appropriated smaller amounts. The State of New York appropriates $30,000 annually for the support of the State Veterinary College. The State of Illinois has made a similar appropriation for this purpose. In addition to these, the States of Iowa, Washington, and Colorado make small annual appropriations for the support of veterinary education. Some other states support a certain amount of veterinary work in their land-grant colleges, the funds for which come in part from the states themselves and in part from the federal Government.

The federal Government has done nothing directly for veterinary education. As has been stated, small appropriations of the federal funds donated to land-grant colleges have in some instances been used to support a limited amount of veterinary work. Such veterinary work, however, has, in most cases, been carried on in connection with agricultural experiment stations, or in courses arranged for agricultural students, and cannot, therefore, be regarded as of moment in relation to the education of veterinarians.

It is now seriously proposed to appropriate federal public funds for the support of branch agricultural colleges and agricultural and industrial academies or high schools in the various states of the Union. This project, while it is young, has acquired considerable headway, and is being strongly supported.

The development of veterinary knowledge is of such immense importance to the United States, that the veterinary profession is fully justified in asking Congress to include it in this scheme and to appropriate money for the support of veterinary schools. The losses from the diseases of animals that ought to be prevented, and that we may reasonably expect to prevent in the future, amount to from $150,000,000 to $200,000,000 a year. Less than 1 per cent. of this annual loss would be ample to support all the veterinary schools needed in the United States.

Appropriations by Congress for this purpose should be so bestowed as to render the largest possible service to the country. To make an appropriation of $10,000 or $20,000 to each state would be equivalent to fostering the establishment of a large number of inadequately equipped, insufficiently maintained veterinary schools, which would cheapen and injure the profession, and retard proper development.

What we need in the United States is a sufficient number of schools of high class, and not an excessive number of schools of low class.

In order that there may be some assurance that federal funds appropriated for this purpose would do the most good, it should be stipulated that anything given by the federal Government for this purpose shall be matched by an equal sum from other sources, that is, from the state in which the school is located, or from benevolent individuals. If, therefore, a school was able to raise $30,000 or $40,000 a year from local sources, and if it should receive a similar amount from the federal Government, it would then be in position to do the kind of work that the veterinary profession so urgently needs.

In view of the needs of the country and of the tremendous value of veterinary education to all of the people, in view of the precedent that has been established for the use of federal funds for purposes similar to this (agriculture), and of the overflowing wealth of the national treasury, it ought to be possible, by concerted effort, to obtain help from that source.

Excepting in the case of a few institutions that are dishonest, and that flagrantly violate the code of ethics, and that will be dealt with by the Association of Faculties, it is idle to talk of the inefficiency of the veterinary schools as they exist to-day. Most of them are as efficient as it is possible for them to be under existing circumstances.

The veterinary profession cannot reach the position of usefulness, importance, and dignity that it should occupy until largely increased funds for educational purposes are supplied from some sources outside of the profession, and the most likely source is all of the people of the United States as represented by the federal Government.

SUGAR FOR HORSES.

Colonel J. A. Nunn, Principal Veterinary Officer in India, has recently issued the following note on the use of sugar as a food for horses :—

The value of sugar as a feeding stuff for horses, mules and other animals does not appear to be quite realised. In many parts of India sugar is largely grown, and "ghur" or "jaggery" can be obtained at reasonable rates; also, from sugar refining works, molasses. This latter, which is a by-product, is largely used on the continent of Europe and in America as a feeding material for all sorts of animals. The common impression seems to be that sugar products are only useful for *fattening* animals, but it has been proved in France that horses can do prolonged and fast work on it. Molasses forms part of the regular ration of the horses of the Paris General Omnibus Company, and competitors in the long distance rides in the French army have been trained on sugar, in some instances as much as 6 and 8 lbs. per diem having been given in addition to the ordinary food. Molasses was very largely used to feed the horses of the American army on in Cuba during the war. They did hard work on it and grass alone, at a time that grain ran short.

Of course with only one or two animals "ghur," "jaggery" or "molasses" can be mixed in the feed by hand. If a large number of animals are fed on them, "and specially with molasses," the plan

adopted by the Americans in Cuba seems worthy of consideration. The molasses was put into a sack and left soaking in a barrel of water all night. In the morning the grass or hay was spread out in a layer, and the solution of molasses and water sprinkled over it with a garden watering pot. The grass or hay was thoroughly saturated and allowed to dry in the sun, so that each separate stalk was covered over with a thin coating. It is claimed for this method that it is more economical, that the ration of molasses is more evenly distributed, that the horses eat very inferior grass and hay with a relish, and that if molasses or treacle, "which are sticky substances," are used they are more easily handled than if mixed up with the food in bulk. If "ghur" or "jaggery" are used and given in the grain ration it is hardly necessary to take this trouble, as they are both easily handled. If, however, the object is to make inferior grass or hay palatable, the American plan would seem to be most practicable and worth the labour expended. In the Austrian army certain preparations of molasses, "known in the trade as molassine and molascute," are authorised as an additional ration for horses after autumn manœuvres, when they are somewhat run down in condition through hard work.

It must be clearly understood that it is not intended in this leaflet to convey the impression that sugar products can be substituted for grain or used indiscriminately, all that they are intended to convey is the fact that sugar is a valuable adjunct, provided that it can be obtained at a reasonable rate. This in certain parts of India is the case; in others, of course, the price would be prohibitive. As has been mentioned, as much as 6 to 8 lbs. of sugar has been given per diem, but this is an extreme case, where money was no object. For army animals the quantity to be used would depend on the market rate. It has, however, been found that from ½ to 1 lb. per head of molasses made into a solution as described, is sufficient to make horses eat inferior grass, and from 1 to 4 lbs. per head per diem will make an astounding alteration in the condition of run-down animals in a fortnight. Although, as far as is known, beetroot sugar is not produced in India, it may be worthy of remark that it is dangerous if given in excessive quantities, 6 to 8 lbs. per diem being the maximum that can be used with safety. The chemical composition of beetroot molasses differs from cane molasses.

SALT FOR DAIRY COWS—INTERESTING EXPERIMENTS.

THE great value of salt for most classes of farm animals is now fairly well realised by dairymen and stockowners, but for all that many will be interested in learning the details of some experiments which have been carried out at the Wisconsin Experiment Station by Professor Babcock, the object of which was to ascertain the influence salt has on the health and milk-producing powers of dairy cows. In these it was found that in every case where cows had been deprived of salt they exhibited an abnormal appetite for it, but in no case did the health of the animals—as shown by general appearance, the live weight, or the yield of milk—appear to be affected until after they had been deprived

of salt for longer than two or three weeks. The period of immunity varied with individual cows, from less than one month to more than a year. In every case where salt was withheld a condition of low vitality was finally reached, in which a sudden and complete breakdown occurred, from which recovery was rapid if salt were supplied. This stage was marked by loss of appetite, a general haggard appearance, dull and lustreless eyes, a rough coat, and a very rapid decline in both live weight and yield of milk. The breakdown was most likely to occur at calving time or immediately after, when the system was weakened or the flow of milk large.

In general, the cows giving the largest amount of milk were the first to show signs of distress, and all suffered less on pasture than when confined to the byre. The behaviour of the cows during the experiment indicated that their food contained sufficient chlorine to maintain them in health while dry for an indefinite period, and it seems probable that, under general conditions, a dry cow or a steer would suffer no inconvenience if given no salt, except that contained in a normal ration. The ration given in the experiment, according to Professor Babcock's calculations, contained chlorine equivalent to three-quarters of an ounce of salt per day, and it is assumed in the report that this is the minimum amount of salt required for 1,000 lbs. of live weight to maintain an animal that is not producing milk. If this amount is not present in the food it should be supplied directly. In addition to this a cow should have enough salt to compensate for the chlorine in the milk produced, the amount to be so given being estimated from these experiments to be one ounce per day for ordinary milkers, exceptionally heavy milkers requiring more. Owing to the uniformity of the results with all the animals, it is claimed that these experiments prove conclusively that salt, in addition to that given in the food, is absolutely essential to the continual health of a dairy cow while producing milk.

Personal.

Colonel JOHN WILLIAM ABERMAN MORGAN, Indian Civil Veterinary Department, is permitted to retire from the service, subject to his Majesty's approval, with effect from August 17, 1907.

Major PEASE, the new Inspector-General of the Indian Civil Veterinary Department, has taken over his new duties.

Colonel F. SMITH, C.B., C.M.G., Army Veterinary Service, has been appointed Director-General, Army Veterinary Service, in the place of Hon. Major-General H. Thomson, C.B., and has been granted the honorary rank of Major-General.

Reviews.

A Manual of Veterinary Physiology. By Colonel F. Smith, C.B., C.M.G., Army Veterinary Service. Third Edition. Completely revised, and in parts re-written. London: Baillière, Tindall and Cox, 1907. Price 15s.

This excellent manual has been brought quite up to date, and it was badly needed, as it has been difficult for some time to get copies of the second edition. It is one of the few standard text-books on *Veterinary* Physiology, since the horse, and not man, is taken as the type, and the comparative physiology of the other domesticated animals treated accordingly. Consequently this book is almost essential to all veterinary students, and would also repay study by practitioners, many of whom seem to think that a knowledge of physiology is of small importance when they are once launched in practice. How can one expect to detect and explain changes of function, &c., if one has only an imperfect knowledge of normal functions? The printing, illustrations, and binding are excellent, as one usually expects from the present publishers.

Translations and Extracts.

INFECTIOUS GRANULAR VAGINITIS IN COWS: ITS TREATMENT AND PREVENTION.

BY DR. H. RAEBIGER, DIRECTOR OF THE BACTERIOLOGICAL INSTITUTE, CHAMBER OF AGRICULTURE, SAXONY.

The author proposes to give a *résumé* of the measures taken in Germany for the treatment and prevention of the disease.

Dr. Ostertag, Director of the Experimental Institute of the Berlin Veterinary School, first drew attention to the causes and extent to which the disease prevailed and the loss it caused. In 1898 he proved, by numerous experiments and observations which have been since confirmed, that it was caused by a streptococcus found in the purulent discharge from the vagina and uterus, and that it not only grew in the fluid, but inside the pus cells. It, however, is never found in the blood. The active agent is a short streptococcus in chains, with from 6 to 9 elements united by a thin envelope that does not take a stain; it is non-motile, but develops rapidly, penetrating into the mucous membrane of the vagina, and has been found there in cover-glass preparations. This capacity of penetrating deeply into the mucous membrane explains the failure in the earlier attempts made in combatting the disease.

The streptococcus stains quickly by any of the aniline stains, but particularly with Lœffler's methyl blue. It grows at the temperature of the room, on agar, coagulated serum, and gelatine and broth, also in urine and glycerine and agar, provided they have not fermented. In fluids, broth, and distilled water the organism forms chains of from 6 to 9 elements; serum and gelatine are not liquified, and milk does not

coagulate, and in glucose broth neither sulphuretted hydrogen, indol, nor gas are formed.

The author mentions the following facts in proof of Ostertag's organism being the true agent of the disease;—

(1) It is always found in the morbid secretions.

(2) Pure cultures always produced the typical catarrh.

(3) The streptococcus could always be found in animals that had been artificially infected.

The disease is transmissible to horses, pigs, sheep, goats, dogs, and most small animals, such as rats, mice, rabbits, and guinea-pigs, but not to the pigeon. The other organisms found in the discharge do not produce the typical catarrh when cows are inoculated with pure cultures.

Natural infection may be direct by means of the discharge from diseased animals, or contact with them, or indirect by means of the bedding, stable utensils, hands of the attendants, or the bull. The calf may be the means of infecting the mother, or may take the disease from her to other cows.

Heifers and young cows are more susceptible than old ones, which seem in some cases to be immune.

The period of incubation varies from two to six days, and although the disease seems capable of assuming a variety of forms in the earlier stages, the symptoms are much the same.

In the commencement of the attack there is slight swelling of the external parts of the vulva and vaginal mucous membrane, the animal evincing pain if it is handled. The membrane is red and inflamed, and covered with a coating of sticky, filamentous pus. In a day or two a number of small lymph follicles form on the inflamed membrane; they are very numerous, and very close to each other, and vary from the size of a millet to a hemp seed. They are typical of the disease, and persist through the attack. They are early recognised, even from a distance, and are more numerous round the clitoris. They are of a dark red colour, and stand out clearly on the inflamed mucous membrane. In some stages of the disease the mucous membrane becomes corrugated up into folds, with the follicles on and between them up to the mouth of the uterus, and in many cases they are collected together in tufts so close, that the membrane resembles a raspberry.

These follicles are smooth on the surface, and solid; they diminish in size, and become of a bright red or yellow colour if the disease becomes chronic. If not, they become transparent, and may be mistaken for vesicles, but if pricked will be found to be solid. They are always present both in the naturally acquired and artificially induced disease, and are characteristic. They are never accompanied by ulceration or vesicles.

The engorgement of the lymphatics gives rise to excessive secretion from the vagina, and if the organism becomes implanted in the membrane the discharge becomes glairy, albuminous, and contains flakes of pus like clotted milk. Contrary to most other vaginal discharges, it does not become at any time fœtid, but dries on the thighs in the form of a dirty grey crust or scab. The discharge is not very profuse, but increases if the animal lies down or walks, and is more abundant in the earlier than the latter stages. In many cases, however, the quantity is so small that it may pass unnoticed.

On account of the irritation the animals are very uneasy, constantly

straining to pass urine and standing with their legs straddled apart. After about the fourth week the swelling of the vulva and vagina subsides and the mucous membrane of the latter assumes a dull orange colour. The follicles also become pale, and as is described, look like herring roe. At the same time the mucous coating over the membrane decreases, but the discharge persists for a long time, particularly if the disease is complicated with uterine catarrh.

Although it is commonly stated that the duration of the malady is only three or four months, in the author's experience the time is double, and he has seen herds that have not become clean for years. The diagnostic symptoms are clearly marked in all stages of the attack, viz., the yellowish-red colour of the vaginal membrane, which is more or less inflamed; the solid enlarged follicles, engorged lymphatics, and the peculiar nature of the discharge, which is not fœtid and contains flakes of white pus. Cows are easily examined. An assistant holds the animal by the nose and another pulls her tail on one side, while the operator opens the lips of the vulva with the finger and thumb of each hand. From fifty to seventy head can be examined in an hour under favourable conditions. Although bulls that have served infected cows may not show any symptoms, they are capable of carrying the infection. Only about 25 per cent. of bulls examined showed anything abnormal. This consisted of slight inflammation of the prepuce where it is covered with long hair, with a greyish-white secretion that escaped in drops if the sheath was pressed from behind forwards. In some few there was more pronounced inflammation of the penis and scrotum.

The characteristic streptococcus was always found in the secretion. In some cows there was temporary uneasiness, but even in severe cases there was neither a rise in temperature nor loss of appetite in either sex. On account of its extremely contagious nature the disease spreads rapidly, and in certain localities from 50 to 80 per cent. of the animals are infected. The complications that it causes give rise to great loss. In many cases cows do not come in season; abortion is common, 60 to 70 per cent.; retention of the placenta, death of the fœtus, endometritis, ovarian disease and loss of milk are the most common. In some cases, although the cow remains in milk its quality is altered. Infected cows' calves, even if born alive, appear to be delicate.

Bulls suffer from impotency, although it is never permanent, and their service is, in many cases, unproductive.

It has been stated, and with all appearance of truth, that the losses by contagious granular vaginitis exceed those of foot and mouth disease.

The only complaint for which it could be well mistaken is vesicular vaginal exanthema. This is, however, a benign disease, and runs its course. There are no follicles, but vesicles form, varying in size from a millet seed to a pea; they contain pus, form and disappear very quickly and seldom leave any trace behind, if they do it is only a small white scar. When these vesicles break there is a profuse discharge from the vagina. In bulls these vesicles form on the mucous membrane of the sheath, and a discharge takes place from the prepuce.

Animals recover without any treatment in about a fortnight or three weeks.

Laboratory experiments were made to find a convenient bactericide, the results of which are given in a tabulated form:

Preparation	Degree of dilution in water	Time occupied in killing the streptococcus	Price per kilogramme
Creoline	2½ per cent.	1 minute	1·80 Marks
Lysol	2½ ,, ,,	1 ,,	2 25 ,,
Bacillol	1½ ,, ,,	1 ,,	·70 ,,
Lysoform	2½ ,, ,,	1 ,,	2·75 ,,
Septoform	2½ ,, ,,	1 ,,	2·50 ,,
Lactic Acid	2 ,, ,,	1 ,,	6 ,,
Pure Carbolic Acid ...	2½ ,, ,,	10 ,,	1·80 ,,
Nitrate of Silver ...	½ ,, ,,	1 ,,	82 ,,
Ichthargan	1 per 1000	2 ,,	200 ,,
Tannin Pura	1 per 100	Inactive after 20 hours	4·80 ,,

The conditions required were: (1) Easily soluble in water; (2) Capable of destroying the organism; (3) Facility in penetrating the tissues; (4) To be non-poisonous; (5) Not to exercise any corrosive action on the mucous membrane; (6) Cheapness.

Tannin was found to be useless. And Ostertag has shown that mineral astringents (sulphate of zinc, copper, and iron) in solution of about 2½ per cent. do not destroy the organism after an hour's contact, and ichthargan, nitrate of silver, and lactic acid are too expensive for use in large quantities in veterinary practice. Carbolic acid acts too slowly, and bacillol seems to be the most suitable. Dr. Raebiger has used it for a long time and highly recommends it. It is perfectly soluble in water, and in a solution of 1½ per cent. it kills the organism with absolute certainty in a minute. It has great penetrative powers into the mucous membrane and is not poisonous. Some experiments as to this point were made at the Bacteriological Institute, Budapest, and it proved to be the least toxic of all the known cresol compounds, 22 to 24 decigrammes per kilogramme live weight being harmless to rabbits, whereas both lysol and carbolic acid killed them in much smaller doses. Bacillol in 2 per cent. solution does not irritate the vagina, and even when applied pure to the skin only slightly cauterises it. It is also cheaper than any other product.

He has tried numerous ways of applying the bacillol. Injections he soon abandoned, as they would not penetrate the canal and were useless, and if a pledget were passed to retain the fluid it was dangerous with pregnant animals from the irritation it gave rise to; powders blown on with an insufflator had the same objection. Ointments seem to be the most applicable and are what Dr. Raebiger now uses, and which, after an experience of 35,000 cases treated under all sorts of conditions, he recommends. It can be applied either in gelatine capsules, bougies, or with a special form of syringe. The one he uses is manufactured by Messrs. Hauptner, 53, Luisenstrasse, Berlin, and is of a capacity of 100 grammes. It contains enough ointment for ten cows or twenty heifers without re-charging.

Dr. Raebiger recommends Bacillol ointment manufactured by the Bacillol Company at Hamburg. For cows he uses a 10 per cent. and bulls a 6 per cent. preparation. According to the severity of the attack, it is applied two or three times a week. He also uses it as a preventive with healthy animals, but the proportion is smaller.

A convenient method of applying the ointment in gelatine capsules has been introduced by M. Ritzer, Lichtenfels. The capsules are

made by the Hamburg Bacillol Company in different sizes, and are introduced with the finger into the vagina as deeply as possible. They melt by the natural heat of the body in about half a minute.

Ritzer recommends their daily use for the first five days, every other day for ten days, and every third for the next fortnight.

The preparation is also made in the form of bougies, about 15 centimetres long, wrapped in a covering that is marked off in a centimetre scale, so that pieces can be cut off of a greater or lesser length as required. They are introduced right up to the neck of the uterus, care being taken that they are not expelled by straining. The bougies are more economical than the capsules, but some skill is necessary to properly apply them. After the animal has recovered, the vagina should be irrigated with a 2 per cent. solution of bicarbonate of soda before she is put to the bull.

Bulls that have come from an infected district, or that have covered cows about which there is any suspicion, should be treated. The hair round the prepuce should be cut off, and a bougie passed into the sheath; it is also advisable to inject a warm solution of bacillol twice a day for a day or so.

Cows that have any affection of the uterus should be isolated from the healthy. In practice it is very seldom that they can be removed to any distance, but they should at all events be placed where the drainage will not come near the healthy. The whole of the buildings should be carefully disinfected, more particularly those parts of the walls that the cows may have rubbed their quarters against. Lime wash with 2 per cent. Bacillol is what the author uses, and he mixes about 5 per cent. of common salt with it. This makes it adhere better to the walls, and it is not so easily brushed off. The tail and all parts that can be reached by it should be washed daily, also the genital organs, and the whole herd should be inspected, and, needless to say, diseased or suspected animals should not be used for breeding purposes. It is advisable to disinfect bulls after serving, especially when the cow has come from an infected district. This is easily done by introducing a bougie of Bacillol into the sheath, and washing the neighbouring parts.

The signs of recovery in cows are cessation of the vaginal discharge and disappearance of the enlarged follicles; at the same time the mucous membrane assumes its normal appearance, but all the same, even when this is seen, the cow may still be capable of conveying the disease.

The same holds good with the bull, but as a rule, if he has been properly treated, he can be looked upon as being clean and safe to use after the fourth week.

In parts of Germany, Baden and Saxe-Altenbourg legislative measures have been adopted, but the author points out that until brought into force for the whole empire there is little hope of the disease being stamped out.

(*Revue Générale de Médecine Vétérinaire.*)

PNEUMO-ENTERITIS IN THE PIG.

BY M. E. LECLAINCHE

THE questions that have arisen regarding the eruptive diseases (*maladies rouges*) of the pig have caused much controversy. One form that used to be classified with the others, bacillar rouget, has been well studied and differentiated, but, in spite of the work that has been done, there is still the very greatest uncertainty.

The earlier workers on the subject, the Americans Detmere, Law, Billings and Salmon, pointed out that there was at least one disease in pigs that differed from rouget, caused by an ovoid organism that greatly resembled that of fowl cholera. The type of these diseases was the hog cholera of the United States, that caused most enormous losses, and in this class they placed the English swine fever, which has been endemic since 1862, and ravaged the country. Different allied forms have been recognised all over Europe, some appearing to be almost identical with the forms that have been differentiated, the others being distinguished by some peculiarity of the organisms that have been isolated.

Most authors are agreed as to the identity of the diseases that are caused by the oval organism, and the new form receives various names in different parts of Europe. In France it is termed infectious pneumo-enteritis, and figures as such in sanitary legislation. The theory that pneumo-enteritis was a separate disease, however, encountered considerable opposition, and in 1895 it was stoutly denied in certain quarters, but both pathologists and bacteriologists sustained the duality of the different groups, and the study of their epidemiology confirmed the correctness of their opinions, although it is difficult to admit the identity of epidemics like hog cholera and swine fever, that may be either severe or only transient, like that of Marseilles, Denmark and Sweden in 1887, with the enzootic forms that are often sporadic, that have been known from time immemorial in the whole of Central Europe.

In 1895 pneumo-enteritis appeared in Hungary with a virulence that till then had been unknown. It commenced at Köbanya, and in a few months 500,000 pigs were affected, of which 350,000 died. The pest ravaged the country for many years, and even to-day has not disappeared.

Professor Preisz, of the Budapest Veterinary School, has made an exhaustive study of the disease, and has come to the conclusion that the so-called pneumo-enteritis of the pig is in reality two different diseases, one due to a micro-organism (*B. suisepticus*), which resembles the very type found in the various forms of hæmorrhagic septicæmias; the second due to the *B. suipestifer*, which resembles the coli bacilli. Both forms, however, are altogether different in all their characteristics, and there is absolutely no reason for attributing any connection between them.

The opinions of Preisz can be more readily accepted, as they agree with the previous ones of Salmon and M'Fadyean, which were subsequently confirmed by Lignières, and it would therefore appear advisable to make two divisions of pneumo-enteritis.

The first is septicæmia, which corresponds with the Pasteurellosis of Lignières; Schweineseuche of the German and American swine plague.

The second, the Peste of Preisz, corresponds to the Salmonellosis of Lignières, American hog cholera and German schweinepest. Preisz considers that these forms are frequently associated, not only existing in the same locality in different animals, but together at the same time in the same animal, and that the lesions are so obscure and so resemble each other as not to be recognisable until a number of bacteria have been examined.

The type and history of the outbreak is of no diagnostic value. English swine fever in an epizootic form, which it is only logical to identify with hog cholera, is pronounced by M'Fadyean to be a septicæmia. The pneumo-enteritis in France that is endemic in that country, but which does not show any tendency to spread, sometimes seems to be caused by the organism of septicæmia, sometimes that of peste.

In many instances bacteriological examination gives negative results, especially so when the animals have been slaughtered and the carcases are fresh; and the numerous attempts at protective inoculation that have been made have been failures.

It has also been proved that it is difficult, if not impossible, to reproduce the disease experimentally. In some cases the disease has been reproduced in an acute form, in others the virus used appears to be quite inert.

As far as France is concerned, it seems that it is septicæmia (Pasteurellose, Schweineseuche), that is the common form of pneumo-enteritis that is seen, and that "peste" is an exception. Even then, when it does make its appearance, it does not assume the virulent type it does in Italy and Germany.

In 1907 two Americans, de Schweinitz and Dorset, made some observations on a disease ("New facts concerning the Etiology of Hog Cholera," *Bureau of Animal Industry Circular*, No. 41, September 28, 1903, and circular No. 43, February 12, 1904) that clinically resembled hog cholera, and which was causing great loss in the State of Iowa. They proved that filtered blood and sterile serum both were virulent.

After de Schweinitz's death, Dorset continued his investigations with Bolton and MacBryde ("Etiology of Hog Cholera," *Revue Générale de Médecine Vétérinaire*, 1905, vol. vi., p. 215), and these authors have shown that the blood of pigs that died of acute cholera is virulent, although no organisms could be demonstrated. In certain cases the bacteria of "peste" were found, but they consider that this was merely a coincidence. They consider that in this case its contagion was of a very feeble degree.

The question arises, is the disease true hog cholera, or is it some hitherto unrecognised one resembling it. This the American observers are very reserved about, but they are inclined to think that it is only a modified form of that disease.

Clintok, Boxmeyer and Siffer ("Studies on Hog Cholera," *Journal of Diseases*, vol. ii., 1905, p. 351) found that the filtered virus obtained during an outbreak in Michigan was virulent.

Up to the present time it is only the American disease that has come under notice, and it may be asked whether the European form is different.

In a report by Professor Stockman, dated March 31, 1906, he says: "It has not been possible in the short time that has elapsed since the publication of the results of the bureau of animal industry,

to carry out a complete investigation, but some experiments have been made in collaboration with Sir John M'Fadyean, and I hope to be able to furnish a further one before the end of the year.

"However, it has been shown that the blood of pigs suffering from swine fever is virulent *after* having been passed through a Chamberlain's filter, and we are enabled to say if the disease is in existence or not, even if there are no typical lesions to be found."

Hog cholera and swine fever are no doubt identical, and in both the filtered virus is virulent.

Hutyra is of the same opinion regarding the Hungarian disease ("Zur Ætiologie der Schweinepest und der Schweineseuche," *Berliner tierärztliche Wochenschrift*, August 9, 1906, p. 607). The fluid from the lungs of a pig suffering from typical septicæmia (Schweineseuche) was proved to be virulent when filtered, and young pigs died after inoculation.

Hutyra says: "A form of septicæmia is seen after inoculation with the filtrate, characterised by the presence of a serous exudate into the pericardium, the same as is seen with filtered aphthous lymph, or in dogs with the filtrate from the nasal discharge. Acute pneumonia was seen in one of three small pigs, resembling septicæmia (Schweineseuche), and both the *B. ovoid* and *B. coli* were present. It would therefore appear that the *B. suisepticus* is only of secondary importance, like the *B. suipestifer* in American hog cholera."

Hottinguer has come to the same conclusion ("Ueber das Verhalinis des Bacillus Suipestifer zur Schweinepest," *Schweizer Archiv. für Tierheilkunde*, 1905, p. 255). These results all point to septicæmia being caused by a specific virus that is virulent after filtration of the same nature as "peste."

Ostertag, however, thinks that this conclusion is premature ("Ist das virus der Schweineseuche und der Schweinepest filtrierbar?" *Berliner tierärzliche Wochenschrift*, August 23, 1906, p. 623), as it is possible that Hutyra may mean the virus of Schweinepest, which is endemic in Hungary. In 1903 Ostertag made some experiments as to the virulence of the virus of septicæmia (Schweineseuche) in Germany after filtration; the results were negative, and these have been confirmed by Pütz and Stadie (Pütz, "Zeitschrift für Fleischs und Milchhygiene," 1904, p. 365; Stadie, "Zeitschrift für Infections krankheiten," 1906, p. 376). The same took place with German Schweinepest, but as the author points out, the experiments were not conducted on a sufficiently large scale for an exact opinion to be given. Although there is nothing absolutely definite discovered regarding pneumo-enteritis in the pig, considerable progress has been made in its study. It is known that the virus retains its virulency after filtration in both American hog cholera and English swine fever, and in all probability the Hungarian form of the disease. It also has been shown that there may be secondary complication, the most common being caused by the *B. suisepticus* and *B. suipestifer*, but it is undetermined whether the endemic pneumo-enteritis of Europe is due to a virus of low virulency, or the *B. suisepticus*, or *B. suipestifer*; this is a matter that has yet to be decided.

This question is one of the highest importance, and it is only by its solution that it can be hoped to cope with the epizootics that play havoc with the pig-rearing industry in the United States and Hungary.

(*Revue générale de médecine Vétérinaire.*)

CRAVERI'S METHOD OF PRESERVING MEAT.

BY BRUSAFERRO.

A SHEEP weighing 36 kilogrammes was injected in the carotid with 3·60 litres, or 10 per cent. live weight, of a saturated salt solution, to which was added 4 per cent. live weight of acetic acid; 1·80 litres, or 5 per cent. live weight, of the same was injected into the rectum.

A calf weighing 273 kilogrammes was treated in the same manner, but a small quantity of saltpetre was added to preserve the red colour of the flesh.

Two other sheep were treated with the same solution, one in the preparation of 8 per cent. of the blood, the other 4 per cent. of the contents of the bowels and stomachs.

After the lapse of two and two and a half months the carcases were still hard and dry, with the exception of the head and neck, which seemed to be infiltrated. The layer of subcutaneous fat was white studded over with yellow patches. The liver was contracted and soft, the spleen flaccid, the stomach and intestines contracted into a hard compact mass, the kidneys, lungs, heart and brain atrophied and presenting a cooked appearance. The sublumbar fat was white, the flesh a bright red, and there was an earthy smell from the body.

When cooked the meat turned out well and of good appearance, but the meat was so salt as to be unfit for use.

The author considers the experiment to be successful.

(*Il moderno Zooiatro.*)

EPIZOOTIC ABORTION IN EWES.

BY PROFESSOR GARCIA È IZCARO (MADRID).

AN epidemic in a flock of ewes came under the author's notice. Abortion usually took place when the ewes were four months gone in lamb. The fœtus was usually born dead and without any difficulty, but those that were alive died very shortly afterwards. The placenta was of a white colour, looking as if macerated, and infiltrated with pus round the cotyledons. The points corresponding to the villi were studded with purulent granulations.

The author recommended: (1) That the external genital organs should be washed with a 1 to 1,000 solution of corrosive sublimate. (2) Uterine douches of 3 per cent. creolin to all ewes that have aborted. (3) Burning the bodies of the fœtuses. (4) Careful disinfection of the pens with a 1 per 1,000 corrosive sublimate, especially where ewes have aborted. (5) Whitewashing the surroundings.

Bacteriological examination disclosed a bacillus resembling Bang's. Four pregnant rabbits were inoculated, one by subcutaneous injection, the other by ingestion with a culture. All four aborted.

Brauer's treatment, of subcutaneous injection of carbolic acid in 4 c.c. doses, once a week, of a 2 per cent. solution, were then given with the following results:—

Pregnant ewes inoculated	115	
Number of abortions before inoculation ...	38	51
Normal births before inoculation	13	
Abortions after treatment	10	57
Normal births after treatment	47	

As will be seen the percentage of abortion fell from 74·5 to 17·53 per cent. In a second flock of 147 before treatment, there were thirty-two abortions and not a single normal birth. After treatment there were 103 normal births and four abortions, 3·75 per cent.

The author strongly recommends Brauer's treatment in cases of epizootic abortion in ewes.

(*Boletin del Instituto de Sueroterapia.*)

CALCULUS IN THE COLON OF A HORSE. LAPAROTOMY.

BY PROFESSOR MAREK, BUDAPEST.

The animal, a 9-year-old gelding in good condition, had been bred by the owner. He was well cared for and had entirely been fed on hay and oats. Nine months previously he had suffered from an attack of colic, otherwise he had always been in good health.

When first seen by the author he had been ill for four hours; the temperature was high and the pulse strong, 36 per minute. No fæces or flatus were passed, the feet were brought close together, and the back arched. Occasionally the horse kicked at his belly, but he did not lie down and seemed careful in the way he moved.

When examined by the rectum the colon was found to be distended with gas to the left between the spleen and abdominal wall, and when the part was pressed upon it caused considerable pain.

A displacement of the intestine was diagnosed, and with the assistance of Professor Plösz laparotomy was performed sixteen hours after the first seizure.

The field of the operation was prepared, chloroform given, and an incision about 15 centimetres long made, commencing at the external angle of the ileum and extending downwards and forwards. When the abdominal cavity was explored by the hand no displacement could be found, but a calculus was detected in the first part of the small colon, in front of which the food had collected.

On account of the shortness of the mesentery the intestine was only brought to the level of the wound with difficulty, when an incision 10 centimetres long was made in it and the calculus extracted, the edges of the wound being brought together with Lembert's catgut sutures. There was a considerable amount of hæmorrhage that was difficult to control, and a portion of the blood escaped into the abdomen. The operation lasted one hour and three-quarters.

During the operation the patient fell into a collapse, and died six hours after.

On examination the intestinal wound was found to be completely closed, but there was the beginning of peritonitis. Death was attributed to it and the hæmorrhage.

(*Zeitschrift für Tiermedizin.*)

OVARIOTOMY IN THE GOAT.

BY MM. OCEANO AND BOBES.

THE authors have found out by experience that the milk of spayed goats loses its peculiar smell, and that they continue in milk for fifteen months after kidding. Also that the quantity of milk is increased, and that it is richer in fat, caseine, phosphoric acid, but poorer in lactose. In addition the spayed animal puts on fat and flesh that have not the peculiar goat-like smell.

(*L'Echo Vétérinaire.*)

FORAGE POISONING CURED BY ARECOLINE.

BY C. G. SAUNDERS, V.S.

ON Sunday, May 19, 1907, at 8 p.m., I was called to attend a horse belonging to a potato dealer. Upon examination I found the horse, an aged bay gelding, standing with his head jammed in the corner formed by the side of the stall and the hay rack, pulse small and weak, temperature normal. The animal was unable to back up, and when pushed over in the stall appeared to have lost all co-ordination in his movements. Anorexia was complete, but thirst appeared excessive, although there was complete inability to drink. The pupils were dilated and the breathing stertorous. Peristalsis was entirely suspended, the horse having passed no fæces since the night before. There were slight muscular tremors over the crural muscles. Urination and urine normal.

Upon enquiry I learned that he had been fed on a quantity of half rotten and damaged potatoes during the previous week, but that he had showed no signs of illness until that morning (Sunday), when he refused his food. I also found the hay musty and of poor quality.

I diagnosed the case as encephalitis caused by faulty food stuff. Prognosis unfavourable.

Treatment.—Hypodermic injection of strychnine sulph., 1 gr. Rectal injection of warm water. I called again on Monday morning and found little alteration, except that the pulse was stronger and that the bowels had moved. I then administered arecoline hydrobromate, ½ gr. Action began in seven minutes; profuse salivation and sweating, and in fifteen minutes the bowels were copiously relieved. Altogether three motions took place, the fæces being offensive and black in colour. In half an hour action had ceased, the animal appeared brighter, the pupils less dilated, and the breathing quieter. I saw him again in the afternoon, when he drank half a pail of water. Eyes normal and general appearance improved. I again gave strychnine sulph., 1 gr., ordered a pail of water to be left with him, and a handful of grass to be given in the evening if he would eat it. The next morning he was apparently as well as ever, and ate his morning feed up with avidity. I left powders of nux vomica and ferri sulph. to be given three times a day, and requested owner to report. The horse went back to work on Thursday, and has worked ever since, has good appetite, and is improving in condition.

I recommended his owner to buy better hay and to leave off feeding the potatoes.

(*American Veterinary Review.*)

CATS AS PLAGUE PREVENTERS.

A Cat Census.

In the *Pioneer* of August 29, "F. B. N.," in considering the possibility of rat extermination, classifies the chief factors under three heads: (1) Limitation of the food supply; (2) epidemic diseases, and (3) casualties by men, snakes, cats, &c. When considering each of these in detail he says the third, *i.e.*, traps and poison, does not seem to be very promising. Although in his preliminary classification he mentions cats, he leaves them out of consideration when he comes to consider details under each head.

It has been proved beyond the shadow of a doubt that rats are the cause of plague epidemics. There is no fact in natural history more generally known than that cats are the natural enemies of rats, and it might have been expected that when it became known that rats were responsible for the spread of plague, it would at once have been recognised that the best way to prevent plague would be to employ the natural enemy of the animal that brings the disease.

But there is another very strong argument in favour of the cat in this country. We know that Jains, Marwaris, and some Brahmins have very strong objections to killing rats. The essence of our present policy is scrupulous consideration for the wishes and traditions of the people. It so happens that most of those who have religious objections to killing rats have strong traditions in favour of keeping cats. Nothing would fit in more thoroughly with their traditions than a recommendation to keep cats. With the aid of the cat, therefore, we have means of carrying on rat-extermination without fear of offending the religious prejudices of anybody. Why, then, is the use of the cat not more strongly advocated? The reasons probably are that the majority of Europeans do not realise how very strong are the prejudices against destroying rats, nor do they understand to what extent the keeping of cats fits in with the traditions of the people.

But it will be said that these are theoretical considerations, and practical proof of the value of cats will be asked for. In January of the present year I gave reasons for holding the view that the ultimate solution of the plague prevention problem will be the keeping of cats.* Later, in the *Pioneer* of May 2, reference was made to the immunity of houses where cats were kept and of villages in which cats were numerous. There was one important question that it was necessary to decide, and that was whether the number of cats was sufficient to make it likely that they would be useful in preventing plague in a district. In order to decide this point a cat census has been taken in the Amraoti district, which has a population of about 800,000. A few of the leading points in this report may be mentioned here. There were 5,000 (odd) cases of plague last plague season. The number of cats in the district has been estimated at 33,000 (approximately). There was thus a fair opportunity of observing whether cats prevented plague or not. The percentage of cats to houses was worked out for 1,017 villages by the revenue officials. Afterwards the number of plague cases was entered opposite the name of each village in the Civil Surgeon's office, so that manipulation of statistics to suit any

* Plague prevention in Nagpur city and district.

particular view would as far as possible be avoided. There are five taluqs, and in each taluq where the percentage of cats was high the number of plague cases was low, and where the percentage of cats was low the number of plague cases was high. The villages were divided into three groups: (*a*) those with less than 20 per cent. cats to houses, (*b*) 20 to 50, and (*c*) above 50. The totals are as follows:—

Under 20 per cent.,	357	villages	with	3,258	cases.
20 to 50	,, 514	,,	,,	550	,,
Over 50	,, 146	,,	,,	14	,,

In the over 50 per cent. group there was one village with 13 cases, but it was found on subsequent investigation that most of the cats had been introduced after the epidemic. It is a good illustration of the exception proving the rule. It may be taken as a rule that a village with 50 per cent. cats will be free from a plague epidemic.

The matter was investigated from another point of view. A comparison was made between houses with cats and houses without cats in villages or mohallas that had recently been infected with plague. It is well known that when plague begins in a village rats are usually very numerous, and one cat cannot be expected to keep away all the rats; but in every case there was a marked difference in favour of the houses with cats. A case of indigenous plague will rarely be found in a house with three good cats that are not over-fed.

There are many difficulties in estimating the number of cats owing to the fact that there are so many wandering cats that have no particular owners, so I cannot vouch for the accuracy of the figures except in a very general way. From inquiries that have been made in various parts of the district, it is evident that there are far more cats in the country than most Europeans have any idea of. There is one very important point: there is no measure which has been proposed for plague prevention which the people take to so readily. It is "The People's Remedy." It is strictly in accordance with their traditions.

"F. B. N." has expressed the view that is held by many people, that killing off rats will simply enable others to get nourishment that would otherwise have starved. There is a good deal of truth in this if cats are left out of consideration. Bring in the cat, and the whole aspect is altered. "F. B. N." says Darwin has proved that it is the struggle for existence that prevents living creatures increasing beyond a definite limit, but he has not taken into consideraation the part which the cat plays in that struggle for existence, and he is, therefore, led into the very erroneous conclusion "that there is no certainty and no very great probability of success from rat destruction."

Man can exercise a great deal of influence in this struggle for existence by using traps and poison, and especially by keeping cats.

A. Buchanan, Lieut.-Colonel, I.M.S.,
Amraoti. *Civil Surgeon.*

P.S.—Since writing the above a letter has appeared in the *Pioneer*, in which it is pointed out that cats take plague, and in which a wrong inference is drawn, that cats, therefore, spread plague. This will be replied to later.—A. B.

(*Pioneer, India.*)

SPONTANEOUS RUPTURE OF THE AORTA IN AN OX.

BY M. PIOT-BEY, CAIRO, EGYPT.

THE author points out that accidents of this nature, although known in the horse, are exceedingly uncommon in the ox, and, as far as he is aware, this is the first case on record.

The subject was a working ox about 14 years of age. He had been under the author's notice since 1904. In 1904 he had been attacked with rinderpest, but had recovered and done his work well.

He suddenly fell down dead on the night of January 31st, 1906, while apparently in the best of health. A *post-mortem* examination was made about ten hours afterwards.

The mucous membranes were considerably congested, which at first sight was misleading, as it appeared to contra-indicate any internal hæmorrhage. On opening the abdomen the organs were normal in appearance. The left lung was slightly congested, more especially at the upper lobes. The pericardium was greatly distended with a large clot, which of itself was sufficient to account for the sudden death, and when the clot was removed the rupture was easily discovered, situated in the aorta close to its bifurcation. It was straight and slightly oblique from above downwards, about 3 centimetres in length.

On examination both the structure of the heart and large arterial vessels was normal, and although the author carefully looked for the atheromatous patches that are so commonly present in cases of aneurism of the aorta, he was not able to find any.

The congested condition of the mucous membranes and anterior lobes of the lungs are attributed to the cold the animal was exposed to at night.

(*Recueil de Médecine Vétérinaire.*)

ALTERATION IN THE POSITION OF THE LIMB CAUSED BY OSTEO-ARTHRITIS OF THE KNEE-JOINT.

BY M. CHANIER.

OSTEO-ARTHRITIS, according to the author, is as frequently seen in the knee as the hock, but it is not so well known or recognised. Lameness in the knee being generally attributed to splints.

Osteo-arthritis in the knee is exactly the same in both its nature and course as in the hock. It is insidious in its development, and at first usually only causes stiffness, but in some cases it gives rise to a considerable degree of lameness without any apparent cause. As a rule, the primary lesion commences on the inside of the joint, and from there extends round it, forming a bony deposit that resembles a spavin in the hock. This gives rise to mechanical interference with the motion of the joint, but very seldom runs on into true anchylosis. It causes more or less distortion, and histologically its structure is identical with spavin.

If the growth extends round the whole of the lower part of the knee there is very little if any deformity, but if on the contrary it is confined to the inner side, as in a spavin, and this is usually the case, the limb

is distorted. In some cases the knee is distorted inwards and forwards, with false anchylosis of the lower row of small bones and the metacarpus. In others the lower row seems pushed sideways, outwards, giving the knee an appearance of being oblique from above downwards and within outwards; in others again the direction may be quite normal.

The lower end of the radius may be inclined inwards, but this is only seen in cases accompanied with considerable lameness.

The upper end of the metacarpal bone may be diverged outwards, and if the exertion is long on the inner side this displacement will appear greater than it is in reality. When the head of the bone is displaced the lower extremity is thrown outwards into the valgus position, and at the same time it is rotated inwards, causing the animal to stand pigeon-toed. Pigeon-toes must not be confounded with twisted feet, which is caused by the bearing surface being uneven and the feet being turned on one side. This is often seen in bad shoeing. This deviation from the normal, although it may not be very marked, nevertheless, exists to a greater or less degree in all horses in which the lesions of osteo-arthritis exist on the inner side of the knee-joint.

Bent knees are also seen with a peculiar trembling. In acute cases, this defect is pretty constant.

These deviations from the normal, when they exist concurrently, cause the defect known as ox-kneed, "genou de bœuf," the angle formed by the forearm and metacarpal bone being opened outwards.

The author has had an opportunity of making a *post-mortem* examination on an animal, the subject of osteo-arthritis of the knee that had to be destroyed on account of an accident. There were signs of advanced osteo-arthritis on the inner borders of the small bones of the knee, and the cartilages were deeply ulcerated; the neighbouring tissues congested, and the synovia thick and turbid. Both the radius and metacarpus were implicated.

The question now arises does the horse assume this unnatural position of his own free will or not? The result of an enlargement on the inside of the knee is to abduct the canon bone; this, however, is corrected voluntarily if the entire limb is adducted, but then the forearm assumes the varus position. It is also easy to imagine a deformity of the joint that will mechanically cause a twist of the canon bone or bent knees.

If, however, this fault is absent or only present in a very slight degree, it is easy to imagine that the correction is made voluntarily by the animal, who naturally assumes the most easy position.

From these observations the author argues that the position the horse's limb assumes from the knee downwards depends (1) primarily on deformity of the knee-joint, or (2) mechanically on the position that he voluntarily places the limb in above the knee, for as there is no direct muscular action on the parts below it he cannot voluntarily abduct or adduct them.

In the case quoted in which a *post-mortem* examination was made, the abnormal position was without doubt assumed to relieve pain. The knee-joint was the apex of an angle opening outwards, and where weight was put on the limb the tendency was for the angle to close, and the pressure was thrown on the outside of the joint, relieving the

ulcerated surfaces of the bones. The same reasoning applies to the bent knees that are so frequently seen.

Where the foot is turned inwards the supporting surface is lessened, also that sustaining pressure, but the position is an involuntary one, and if the valgus position of the canon bone is very pronounced it is compensatory.

(*Revue Générale de Médecine Vétérinaire.*)

Letters and Communications, &c.

Mr. W. A. Byrne, Mr. J. Macara-Finnie, Mr. Heinemann, Mr. Prime, Mr. Garside.

Books and Periodicals, &c., Received.

Bureau of Animal Industry; Department of Agriculture and Technical Instruction for Ireland; Board of Agriculture; Journal of the Royal Army Medical Corps; Henry Phipps Institute, Third Annual Report; The Rhodesian Agricultural Journal; Journal of Hygiene of Victoria, Australia.

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